# REPORT RESUMES

ED 020 762 52 LI 000 818

STUDY TO DEVELOP A RESEARCH PROGRAM FOR THE DESIGN DEVELOPMENT OF MODERN COLLEGE LIBRARIES. FINAL REPORT.

HISTORICAL EVALUATION AND RESEARCH ORGANIZATION

REPORT NUMBER BR-7-C-031 PUB DATE 15 MAR 68
CONTRACT OEC-1-7-070031-5137
EDRS PRICE MF-$0.50 HC-$4.40 108P.

DESCRIPTORS- *COLLEGE LIBRARIES, *LIBRARY FACILITIES, *LIBRARY SERVICES, *LIBRARY RESEARCH, *INFORMATION SYSTEMS, SYSTEMS ANALYSIS, LIBRARY EQUIPMENT, EDUCATIONAL FACILITIES,

THIS STUDY FORMULATES A RESEARCH PROGRAM TO FACILITATE THE ESTABLISHMENT OF LIBRARIES FOR SMALL LIBERAL ARTS COLLEGES USING MODERN LIBRARY METHODS AND TECHNOLOGY AND NEW TECHNIQUES OF INFORMATION STORAGE, RETRIEVAL AND TRANSFER. AS A RESULT OF INTERVIEWS WITH LIBRARIANS AND OTHERS IN THE UNITED STATES AND EUROPE AND FROM A REVIEW OF CURRENT LITERATURE, AREAS IN WHICH FURTHER RESEARCH IS NEEDED ARE DEFINED AS (1) SYSTEMS ANALYSIS AND DESIGN, (2) NEW TECHNOLOGY AND TECHNIQUES, (3) COORDINATION OF ADMINISTRATION AND USER-ORIENTED SERVICE, (4) INTERRELATIONSHIP OF EDUCATION, INFORMATION AND LIBRARY SERVICES, AND (5) POTENTIALITIES OF INFORMATION STORAGE AND RETRIEVAL. NEW EDUCATIONAL CONCEPTS AND TECHNIQUES AFFECTING LIBRARIES INCLUDE MORE INDEPENDENT STUDY, INTEGRATION OF ACADEMIC DISCIPLINES, AUDIO-TUTORIAL TEACHING METHODS, LEARNING CENTERS, AND THE LIBRARY-COLLEGE. THE AMBIGUOUS RELATIONSHIPS OF NON-BOOK INFORMATION MEDIA--AUDIO-VISUAL, REPROGRAPHIC, MINIATURIZED, AND AUTOMATED--TO THE COLLEGE LIBRARY REQUIRE CLARIFICATION. THE OBJECTIVES OF EDUCATION, THE ROLE OF THE LIBRARY AND THE LIBRARIAN, COORDINATION WITH THE FACULTY IN BOOK SELECTION, BUDGET PROBLEMS, POTENTIALITIES OF THE COMPUTER, INTERLIBRARY COOPERATION, COST EFFECTIVENESS, AND DECENTRALIZATION VS. CONSOLIDATION, ARE PROBLEMS THAT NEED STUDY AS A BASIS FOR DEVELOPMENT OF A NEW COLLEGE LIBRARY. A DETAILED OUTLINE OF A RESEARCH PROGRAM IN INCLUDED. (AUTHOR)

ED020762

HERO

000818

000818 ~~7-C-031-52~~

BR-7-C-031
PR-52

# STUDY TO DEVELOP A RESEARCH PROGRAM FOR THE DESIGN DEVELOPMENT OF MODERN COLLEGE LIBRARIES

ERIC/CLIS
JUL 23 '88
UNIVERSITY OF MINNESOTA

FINAL REPORT
Contract No. OEC-1-7-070031-5137
March 15, 1968

**HISTORICAL EVALUATION AND RESEARCH ORGANIZATION**
1403 DOLLEY MADISON BOULEVARD
McLEAN, VIRGINIA 22101

BR-7-C-031
PA-52

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

# STUDY TO DEVELOP A RESEARCH PROGRAM FOR THE DESIGN DEVELOPMENT OF MODERN COLLEGE LIBRARIES

FINAL REPORT
Contract No. OEC-1-7-070031-5137
March 15, 1968

U.S. DEPARTMENT OF
HEALTH, EDUCATION AND WELFARE

Office of Education
Bureau of Research

FINAL REPORT

Contract No. OEC-1-7-070031-5137

# STUDY TO DEVELOP A RESEARCH PROGRAM FOR THE DESIGN DEVELOPMENT OF MODERN COLLEGE LIBRARIES

HISTORICAL EVALUATION AND RESEARCH ORGANIZATION
1403 Dolley Madison Boulevard
McLean, Virginia 22101

March 15, 1968

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

# TABLE OF CONTENTS

Page
SUMMARY . . . . . . . . . . . . . . . . . . . . . . . . . . 1

PREFACE . . . . . . . . . . . . . . . . . . . . . . . . . . 4

I. INTRODUCTION . . . . . . . . . . . . . . . . . . . . . . 6

Purpose and Scope
Methodology

II. COLLEGE LIBRARIES AND INFORMATION SYSTEMS TODAY; A SUMMARY STATUS REPORT . . . . . . . . . . . . . . . . . 9

Technology and the New Media
New Educational Concepts Affecting Libraries
Problems, Changes and Trends
Some European Developments

III. THE REQUIREMENT FOR A RESEARCH PROGRAM . . . . . . . . . 18

IV. RESEARCH CHALLENGES AND OPPORTUNITIES . . . . . . . . . 25

Organization for Direction, Coordination, and Evaluation
Systems and Systems Analysis
Opportunities and Problems in New Technologies
Interrelationship of Education, Information, and Library Service
Coordination of Administration with User-Oriented Service
Information Storage and Retrieval Possibilities
Specifics of Establishing a New College Library

V. CONCLUSIONS . . . . . . . . . . . . . . . . . . . . . . 54

A Proposed Research Program Outline

VI. RECOMMENDATIONS . . . . . . . . . . . . . . . . . . . . 59

APPENDICES

Page
A. Terms of Reference . . . . . . . . . . . . . . . . . . 60
B. Postulated Context . . . . . . . . . . . . . . . . . . 65
C. Impact of Non-Conventional Processes on Conventional Library Functions and Services . . . . 68
  Enclosure 1: Preliminary List of Non-Conventional Processes
  Enclosure 2: Sample Process Work Sheet
D. Interview Planning . . . . . . . . . . . . . . . . . . 71
  Enclosure 1: List of Questions
  Enclosure 2: Sample Interview Work Sheet
E. Institutions Visited and Individuals Interviewed . . . 80
F. A Proposed Standing Committee on College Libraries and Information Transfer Research . . . . . . . . . 86
G. Bibliography . . . . . . . . . . . . . . . . . . . . 87

# SUMMARY

This is a report by the Historical Evaluation and Research Organization to the Office of Education on a study entitled "Study to Develop a Research Program for the Design Development of Modern College Libraries." The researchers felt that it was unrealistic to consider academic libraries in isolation from the academic processes which it is their purpose to support. All aspects of college information systems, and of the process of information transfer by means of media including (but not limited to) books were explored in the process of the study.

In the performance of the study two principal research methods were used: literature review and field observations and interviews. Although not originally anticipated, the observation and interview program provided the principal basis for the findings and conclusions of the report; some 56 academic and other institutions were visited, more than 120 persons were interviewed.

The objective of the study was "to ascertain the extent to which a research program can be formulated to develop from inception a completely modern library for a new, four-year liberal arts college, to the end that a practical laboratory and demonstration model library could be created, utilizing and implementing the proven new library and information storage, retrieval, and transfer techniques that have evolved in recent years, in order to facilitate library development for new colleges, or library redevelopment for existing colleges."

Based primarily upon the observation and interview program, a survey of the status of "College Libraries and Information Systems Today" is presented in the report. This survey discusses technological developments and new media affecting libraries and information systems; new educational concepts affecting libraries; and problems, trends, and changes that are relevant to the objective of the study. It also reports on some relevant European developments in Denmark, the Netherlands, France, and Great Britain.

The interviews and the survey of recent literature revealed an overwhelming consensus of informed opinion on the need for a coordinated and comprehensive research program which would enable academic libraries to adapt themselves to new technologies and new educational concepts. The report discusses at some length the nature of research required in such a program. Based upon this discussion, a proposed research program is laid out in considerable

detail, and presented in outline form in the Conclusions. These Conclusions are summarized as follows:

A. Organization for Direction, Coordination, and Evaluation
   1. Research program objectives
   2. Machinery for authoritative, responsible direction

B. Systems and Systems Analysis
   1. The library as the prototype academic information system
   2. Relationships between academic information systems
   3. Systems analysis methodology
   4. Continuing research in information transfer

C. Opportunities and Problems in New Technologies
   1. Man-machine relationships
   2. Non-book (audio-visual) media
   3. Reprography
   4. Miniaturization
   5. Automation
   6. Cooperative research with industry

D. Interrelationship of Education, Information, and Library Service
   1. Theoretical premises
   2. Image and self-image of the librarian
   3. Role of information systems in the educational process
   4. Learning centers and their problems
   5. The Library-College movement

E. Coordination of Administration with User-Oriented Service
   1. The concept of user-oriented service
   2. Evaluation of administration and service efficiency
   3. Employment of part-time student help
   4. Centralized and/or packaged processing
   5. Budgets and operations

F. Information Storage and Retrieval Possibilities
   1. History and trends
   2. Requirements and goals
   3. Possible research and development

G. Specifics of Establishing a New College Library

1. Operational philosophy
2. Organizational relationships
3. Practical planning considerations

The report recommends that the Office of Education should approve a program along the lines of that presented in the Conclusions, and that, in view of the absence of an existing mechanism suitable to implement such a program (including control, coordination, supervision, and evaluation), the Office of Education should also, at an early date, sponsor an intensive one-week workshop of no more than ten qualified scholars to prepare detailed recommendations for appropriate machinery to implement the proposed research program.

# A RESEARCH PROGRAM FOR SMALL COLLEGE LIBRARIANS AND INFORMATION SYSTEMS

## A HERO Study Report

## PREFACE

This is a report on a study entitled: "Study to Develop a Research Program for the Design Development of Modern College Libraries," undertaken by the Historical Evaluation and Research Organization (HERO) on the basis of a cost-sharing contract with the United States Office of Education, which provided 83.2% of the budgeted cost of the research. The remainder of the budgeted cost, and additional expenditures, were incurred by the Historical Evaluation and Research Organization (HERO) as an aspect of support which it has provided the College of the Potomac project, for the establishment of a new four-year, liberal arts college in the Washington metropolitan area.

The terms of reference for the study are contained in the study proposal submitted to, and approved by, the Office of Education. The study was initiated on June 29, 1967, and is completed with the submission of this report to the Commissioner of Education.

The study participants are listed below:

Billie P. Davis; Administrative Assistant, College of the Potomac
T.N. Dupuy; Executive Director, Historical Evaluation and Research Organization; Trustee, College of the Potomac; Study Director
Marguerite Fischer; Library Consultant
Grace P. Hayes; Staff Member, Historical Evaluation and Research Organization
Gerald J. Sophar; Executive Director, Committee to Investigate Copyright Problems; Information Systems Consultant

The Study Director was the principal researcher, and the author of this report. Mrs. Fischer and Mr. Sophar contributed greatly to the development of the study methodology, to the preparation of the initial documents (contained in Appendices C and D), and carried out much of the essential search and review of literature in the fields of librarianship and of information systems. Mrs. Davis and Mrs. Hayes assisted in the organization and analysis of the materials collected in the process of the study, in preparing various portions of manuscript for the report, and in the editing of the overall report.

As Study Director, and as the author of this report, I am pleased to acknowledge the very important contributions to this study made by the other participants, and recognize that whatever merit the report may have is largely the product of their efforts. This does not in any way relieve me, however, of full responsibility for the report and for any shortcomings that it may have.

T. N. Dupuy
Executive Director

McLean, Virginia
March 15, 1968

# I. INTRODUCTION

## Purpose and Scope

This report presents the results of a study, the object of which (as stated in the terms of reference, Appendix A), was "to ascertain the extent to which a research program can be formulated to develop from inception a completely modern library for a new, four-year liberal arts college, to the end that a practical laboratory and demonstration model library could be created, utilizing and implementing the proven new library and information storage, retrieval, and transfer techniques that have evolved in recent years, in order to facilitate library development for new colleges, or library redevelopment for existing colleges."

In pursuit of this objective, the researchers did not consider that they were limited by traditional concepts of libraries as merely repositories of books and other printed materials. In the process of the study one of the researchers suggested that the definition of a library, at least within the framework of this study, should be as follows:

> "A library is a collection of information-transferring material which is arranged, organized, and controlled for the purpose of study and research, or of general recreational information transfer. The principal content of a library is usually printed or written material in the form of books, and the principal means of information transfer is reading; many libraries, however, include collections of films, microforms, phonograph records, sound tapes, lantern slides, and the like, which transfer information by means other than reading."

The researchers felt that it was unrealistic to consider academic libraries in isolation from the academic processes which it is their purpose to support. It was believed to be important to investigate various ways in which the contents, or potential contents, of a college library are being or could be applied in the educational process. Thus all aspects of college information systems, and of the process of information transfer by means of media including (but not limited to) books were explored in the process of this study.

## Methodology

The research team included one professional librarian, one information systems specialist, two social scientists with extensive research experience, and one education specialist. One of the social scientists, the project director, has also had considerable college and university teaching experience. Two principal research methods were used: literature review and field observations and interviews. Throughout the process of the study the researchers kept reminding themselves that their objective was not to seek answers, but rather to seek questions as a basis for elaborating a long-range research program from which, it is to be hoped, answers to the questions will eventually emerge.

The first step in the research process was to establish at least a tentative model of the kind of institution for which the research would be undertaken. This resulted in the preparation of a paper entitled: "Postulated Context," (Appendix B) which describes the kind of "new, four-year liberal arts college" which the researchers believe was envisaged in the statement of the study objective.

The researchers believed that a useful basis for the exploration would be to examine the impact of new and unconventional processes on traditional library functions and services. For the purpose of this research "new and unconventional processes" were considered to be any techniques, media, tools, or systems to be found in college libraries or information systems today or in the near future, but that would not be present in the traditional or conventional library of the recent past. Appendix C includes the "Preliminary List of Non-Conventional Processes" that was prepared by the research team, and a sample "Process Work Sheet," of which ten were prepared, to indicate the impact of each of the non-conventional processes on conventional library functions and services (as perceived by the study team) in the library world in general, and in the small college library in particular. From the entries and remarks to be recorded on the ten different process work sheets, it was hoped that the areas requiring further research, and thus the elements of the research program, would become evident.

The list of processes and the process work sheets, however, proved to be more useful as a basis for discussion with librarians and other scholars interviewed in the course of the project, than they did in accomplishing their original purpose. It was discovered that to complete these work sheets in a thorough, comprehensive manner would require a greater expenditure of research effort than the budget would allow. We think this would be worthwhile within the research program we recommend, however.

Considerable thought and preparation were devoted to the preparation for the interview program planned for the project. It was believed that the list of non-conventional processes and a sample of the processes work sheet should be sent to each person to be interviewed. To provide the prospective interviewee with as clear a picture of the nature of the study as possible, each was sent an extract from the proposal approved by the Office of Education and a copy of the "Postulated Context" paper. Also, to suggest the kind of questions that would be asked in the interview, a list of six questions was sent. At the interview itself, a lengthy "Interview Work Sheet" provided the basis for discussion. (The list of questions, and the Interview Work Sheet are included in Appendix D.)

In the interview, both the interviewer and the interviewee had a copy of the Interview Work Sheet in front of them. This provided a basis for discussion which was not, however, limited to the topics on the work sheet. Notes taken during the interview were elaborated into an extensive, informal, confidential, memorandum for the record. In those cases where it was felt advisable, a copy of the memorandum was sent to the interviewee for his information, and for comment.

It was soon found that the interviews were providing even more value to the object of the study than had been originally anticipated. Consequently, the interview program was substantially increased, from an original estimate of about 20, to a total number of approximately 120 scholars and specialists who were interviewed in the course of this project. This includes 19 individuals interviewed in Denmark, the Netherlands, France, and Great Britain in the expectation--which proved to be well-founded--that foreign experience would have considerable relevance. (This foreign portion of the interview program was supported completely by non-Government funds.) Since some of the individuals interviewed were "targets of opportunity," they did not have a chance to see the preliminary papers in advance. These were, however, a relatively small proportion of those interviewed. In some instances, where it did not seem appropriate (as, for example, when observing an innovational educational process only remotely related to libraries), the interview work sheet was not employed.

On balance, the interview program in this study has provided the main basis for the contents of this report, and for the research program which is presents.

Appendix E lists the institutions visited, and the individuals interviewed, during the interview program.

## II. COLLEGE LIBRARIES AND INFORMATION SYSTEMS TODAY;

## A SUMMARY STATUS REPORT

### Technology and the New Media

The college library is faced not only with the problems imposed by the current and continuing multiplication of printed materials--books and periodicals--but with problems related to the growing numbers of other materials and means for transmitting information or ideas. While the appropriate relationship of these non-book media to the traditional library has not yet been clarified, they are--to the extent that they provide sources and resources for scholarly research--in fact supplemental and complementary to printed books and so have an impact on the college library.

The new information media or processes can be grouped roughly into four categories: audio-visual, reprographic, miniaturized, and automated. The first of these includes recordings and sound tapes, various types of projectors for still or animated images, radio, and television.

Reprographic media range from carbon paper, through conventional printing, to the numerous duplicating processes based on electrostatic techniques. The audio-visual and reprographic categories are beginning to overlap, as in facsimile transfer. The ease with which printed materials may be duplicated in the various reprographic techniques raises the serious problem of the violation of copyrights. Although librarians do not seem to be particularly concerned about this, it is a matter that must be given serious consideration.

Miniaturization includes any method of reducing documents in size for purposes of convenience and saving space. The most common manifestation of miniaturization is microform--photographic images on roll film or microfiche, or various types of aperture cards or opaque cards. In these the reduction in size from original documents is usually about 20 to 1 (the government standard is 19 to 1). The most recent microform development is ultramicroform or micro-microform, in which images are reduced 100 times or more.

Although far from new, microform has yet to be generally accepted and adopted on a wide scale. Furthermore, its potentialities do not yet appear to have been thoroughly investigated. The greatest use has been in taking advantage of the considerable saving of space which it provides. It also permits libraries to obtain copies of rare books or books otherwise unavailable or beyond their means. Although most users dislike microform, mostly because of [illegible] convenience in reading, there is hope that further research [illegible] overcome some of its drawbacks.

In the fourth category--automation--information is manipulated and processed electronically, by computer. The computer has obvious, although still largely unrealized, capabilities for handling administrative chores for the librarian and also aiding his research and research-support function through the retention and organization of vast numbers of items of information. This latter potentiality creates a mutuality of interest between the librarian and the information systems specialist, particularly in the area of information storage and retrieval.

The proliferation of non-book information media has made it necessary to develop academic services for the use of these media that are comparable to services that are performed by libraries with respect to books. These non-book media services, generally called Instructional Services, are usually centered in one office or department which is at some institution independent or, and at others directly related to, the library. Since such a department and the library both exist to provide information resources, their roles are closely related, regardless of the administrative relationship.

## New Educational Concepts Affecting Libraries

In addition to the proliferation of materials and information media, new concepts in education are changing the relationship of the library to the academic community and affecting the services the library is expected to provide. Many of these concepts have been stimulated by new developments in technology, and most of them are the subject of considerable discussion.

Hardly a new concept, but one which has been given new emphasis, is independent study, both as a means of accommodating a progress rate to a student's abilities and as an encouragement to resourcefulness and responsibility through study in depth. New techniques of programmed learning--using either a computer, a less complicated teaching machine, or a structured book--are providing significant aids to independent study.

Another concept is that of academic integration. This is manifested in the trend toward consolidation or closer interrelation of academic departments in an effort to break down barriers between academic disciplines and to demonstrate to students not only the interdependence of these disciplines and the various courses in the curriculum, but also real-life interrelationships.

Particularly exciting is the concept of the audio-tutorial method of teaching--designed, developed, and most effectively employed by Professor S.N. Postlethwait, Professor of Botany at Purdue. This specialized type of programmed instruction relies upon sound tapes, visual presentations, and laboratory experiments, augmented with demonstrations, printed materials and carefully prepared worksheets. The student works at his own pace, within a scheduled program (although the system does not need to be tied to a schedule) assisted by an instructor as necessary. He may attend a weekly lecture by the professor if he wishes, but must participate in frequent small group discussions led by an instructor.

Although the organization and function of the college library are being affected by all of these technological and conceptual developments, there is no agreement among librarians as to what their effect is or what it should be. Perhaps the only area of agreement is that a library should provide prompt and efficient service to its users, whether in the maintenance of its collection of books and other materials, or in their organization so as to make them readily available.

Relatively little has yet been done to accomplish really effective coordination between libraries and the various other college information systems or resources, such as the new instructional services in non-book media. At the University of Pittsburgh the problem has been approached by combining all information and communications services under a Director of Communications, responsible to the Chancellor.

## The Learning Center Concept

Another approach can be seen in the learning center concept. As a means of most effectively and economically using new electronic media for instruction, and for integrating these with more traditional, book-based methods, learning centers, or learning resources centers, are being developed at some colleges, usually built around a closely coordinated library-audio-visual complex. In such centers electronic hardware and related equipment and materials are concentrated in a single building or a complex of buildings, to become the instructional heart of the institution.

Four institutions visited during this study--Stephens College, Oakland Community College, Oral Roberts University, and Oklahoma Christian College--have adopted the learning center concept of education. Four others--the Santa Cruz campus of the University of

California, the Chicago campus of the University of Illinois, Florida Atlantic University, and the University of South Florida --have adopted some features of it. The results vary widely, and there is no general organizational pattern. There are common problems, however, of two types: first, those concerned with management, structure, coordination of activities, and functional relationships within the learning center and between the learning activities and other campus activities; and, second, those related to availability of materials.

Three organizational patterns for learning centers are illustrated in the institutions visited. In the first of these patterns, overall direction is provided by the senior academic administrative staff (academic or assistant dean), with directors of library and instructional service in co-equal, subordinate roles. The second is library-oriented, with a single director trained essentially in library operation and management. The third is media-oriented, with the emphasis of the direction primarily on non-book media, coordinated with relatively conventional library activities. In all three of these there remains the need for considerable cooperation between librarians, media specialists, and faculty.

The availability of suitable non-book material for a college learning center presents real problems. Commercially prepared materials vary in quality and rarely are perfectly suited to an instructor's approach to his subject. Locally prepared materials are often amateurish and unsophisticated in techniques. Both types quickly become outdated. There is rarely time for a professor to prepare adequate materials himself. Live TV presentations on a multi-campus network offer one possible solution to part of the problems, by providing one professor with time to prepare good and adequate material while another professor is presenting his course.

## The College-Library Movement

Hand-in-hand with increasing emphasis on independent study has emerged the concept of the library-college. This may be defined as "a college in which the dominant learning mode is independent study by the student in the library, bibliographically guided, intellectually aroused, and spiritually stirred by the faculty." The library becomes the heart of the college, with librarians and teachers sharing their traditionally separate functions. While there is much difference of opinion as to the degree to which such a development is practicable or desirable, most educators and librarians are in accord with the aim for close association of classroom and library.

## Problems, Changes, and Trends

While relatively few colleges and librarians are seriously considering developing a learning center or a library-college, in a number of major functional and operational areas, changes are being made. Probably the most interest has been shown in automation, but the results have been extremely disappointing.

Despite much talk and planning, relatively little has been done to use the capabilities of the computer. Although already an accepted tool of college administration, its relationship to the library is far from clear. Except for using a computer for the administrative chores of the library, most librarians are confused, or doubtful, about the possibilities for integrating computer and library services, even in those institutions where the computer is being used as an instructional and study tool. They are also reluctant to spend funds from limited budgets on hardware which they do not understand or trust.

Budget problems, as well as convenience, have had a positive effect in another area, by stimulating increased use of commercial services, not only for processing of books but even for their selection and purchase.

Perhaps the greatest developments in college libraries have been in the area of interlibrary cooperation, both within the academic community and with special libraries outside it. The simplest means of cooperation among libraries is the establishment of a regional union catalog of the holdings of all cooperating libraries. Automation holds great promise in this type of endeavor. Without or with a union catalog some libraries are arranging for selective specialization and for rapid transfers of books through interlibrary loans. There has been some talk, but little action, about establishment of regional, centrally located depositories to which participating libraries may send little-used books in order to control the size of their collections.

Recent developments have resulted in a trend toward expanding the functions of the librarian himself, at least partially in the direction of the library-college. One group of librarians recommends including on the reference staff specialists in all the academic disciplines, who can increase the usefulness of the library in specific and informed ways. Those colleges, particularly small ones, which strive to centralize collections and discourage departmental fragmentation, offer both challenge and opportunity to the librarian in providing service to the college faculty. Optimum student use of the library seems to depend upon close and cordial cooperation and coordination of library staff and teaching faculty.

The development of an appropriate book collection from among the myriads of publications is a serious problem for the small college library. The collection must include the basic reference tools that guide the searcher to specific sources and the librarian to the location of the sources, whether in his library or elsewhere. As a guide to the other books that should be included a librarian may find considerable help in the American Library Association's recent publication, Books for College Libraries, and its monthly periodical, Choice. While a small library cannot provide the great resources for research that a university library can, it must include as many as possible of the books its curriculum and its faculty users require.

There is a wide range of solutions to the problem of attuning library acquisitions to the requirements of the faculty. They include informal liaison, assignment of a member of each college department as formal liaison with the library staff, representation of each department on a central library committee, and assignment of library staff members as liaison with specific academic departments. Responsibility for assuring good communications between the library and the academic departments rests with the librarian. Whether he should also be responsible for the selection of books is not so generally agreed, and the procedure for book selection varies even among departments of the same college. Librarians usually believe that, because of their professional qualifications, the responsibility should be theirs, subject to faculty advice and comment.

On all campuses there seem to be faculty library committees, but these vary widely in their functions and effectiveness. The effectiveness varies with the organizational relationship, whether it be direct, through academic deans, or through administrative vice presidents. Some librarians are active in their relations with the faculty, endeavoring in this way to make their libraries a dynamic element in the educational process, while others react responsively, concentrating on acquiring and organizing their collections while assuming that their clients will make the most appropriate use of them.

Uncertainty as to which if any of the new concepts and largely experimental devices will ultimately prove desirable or even essential has caused some colleges to delay construction of library buildings. It seems to be considered by most specialists, however, that it is vain to delay construction in hope that some kind of stable equilibrium will be achieved. Instead, new building plans should provide maximum flexibility both in the interior arrangements and in space for electronic wiring for future installations.

Construction problems as well as basic problems of library policy have resulted in increasing use of library consultants, often with disappointing results. Experience with one library or with one type of management problem does not necessarily indicate an ability to help with others.

While new techniques of systems analysis seem to be applicable to library matters, their successful use is handicapped by a lack of standards, common operational terminology, and meaningful statistics. There is an urgent need for a major effort to remedy these deficiencies and to obtain uniform statistics upon which to base the quantitative and the qualitative factors needed for systems analysis, and for evaluating cost effectiveness of library operations.

## The Network Trend

An ambitious effort to exploit new equipment and techniques began in 1964 with the establishment of the Interuniversity Communications Council. Now with more than 60 participating institutions, representing about 180 campuses, this organization, known as Educom, seeks to encourage the establishment of electronic multimedia information networks in order to make material promptly available to scholars anywhere in the United States. Although Educom is still in the conceptual stage, it has aroused much comment. While its supporters argue that such developments will eventually come and must be planned for, there are critics who suggest that it is unrealistic to anticipate developments still many years beyond existing capabilities, and to ignore the tremendous costs involved.

There are already in existence several relatively modest regional library-information networks. The six New England state university libraries have established a Regional Processing Center, based largely upon common exploitation of tapes provided by the Library of Congress MARC (machine readable cataloging) program. This center will attempt to provide such basic services as creation and maintenance of a machine catalog data file and facilities for search and retrieval, production of book labels and book form catalogs, acquisition control, and production of conventional catalog cards. Similar networs are being developed in other areas --notably New York, California, Ohio, and the Pittsburgh region-- and may serve as prototypes for regional computerized catalogs in the future.

## Information Storage and Retrieval

Information storage and retrieval systems have been developed in great variety, primarily in the fields of science, technology, and statistics. Ranging from the printed abstract and conventional index to sophisticated computer-based systems, as sources of information they are a concern of the librarian, who must be aware of the probability of future expansion in this area.

In the area of non-book information media, a project called "National Information Center for Educational Media (NICEM)," is being developed. Its purpose is to establish a complete inventory of the non-book offerings of every commercial organization and the catalog holdings of as many as possible of the educational institutions of the United States. This computerized catalog has implications not only for information storage and retrieval; it may well be the prototype of a regional network data bank.

## Some European Developments

Visits to a few institutions in Denmark, the Netherlands, France, and Britain revealed some interesting developments. Whereas in France little is being done, in Denmark and the Netherlands some moves toward library automation are being made, and in Britain intensive efforts are underway. Britain appears to be substantially behind the United States in the state of computer technology, but in its utilization, Britain's status is at least comparable and in some respects may be ahead. This can in large part be credited to the Office of Scientific and Technical Information under the Ministry of Education and Science, which coordinates activities relating to information processes and encourages cooperation between libraries as well as focusing research on library-connected automation.

Among other developments, courses in library orientation at the Danish Technological University at Copenhagen and the University of Reading seem to be particularly successful. Information storage and retrieval is a subject of considerable interest both in the Netherlands and in Britain, although no European country seems to use microform as widely as the United States. In Britain some central depositories are being established, to control the size of collections by thinning-out, or purging, little-used books and at the same time make them available to a larger group. Standards of library statistics are the subject of investigation by the British Standing Committee on National and University Libraries.

One of the most interesting developments is the "Bibliophone" book retrieval system at the Technical University of Delft.* A dialed request from a reader activates a computer which alerts the attendant in the appropriate book stack and tells him with a pattern of lights which book is requested and where it is located. He merely has to remove it from the shelf and deliver it by chute to the circulation desk.

---

*A new American tool that seems to promise help in providing books more rapidly to the user is a system for automated book retrieval called the "Randtriever," which will automatically seek a book from the stacks, deliver it to the circulation desk, and return it to the stacks after use. Although expensive to install, this system may prove well worth its initial cost.

The use and availability of non-book media is less developed in these countries than in the United States, but experiments are being conducted at the University of Sussex and other British institutions.

## III. THE REQUIREMENT FOR A RESEARCH PROGRAM

The librarians and information systems specialists interviewed in the course of this study were unanimous in endorsing the need for an overall, coordinated research program for the design of small college libraries, such as is envisaged in the statement of objective of the study. The emphatic nature of their responses, the amazing degree of identity and similarity in suggestions for specific study, and the extensive corroboration in recent literature of the urgent requirement for research in the same general areas suggested in our interviews, all indicate that these comments should not be discounted.

A recent issue of the *Wilson Library Bulletin* (May 1967) is devoted to "A Kaleidoscope View of Library Research," in which the general and specific requirements of library research, as seen by leading library educators and practicing librarians, are discussed. Many of these published views are representative of, and consistent with, the attitudes noted in the survey.

### The General Requirement

The editors of the *Wilson Library Bulletin* were impelled to seek the views of eminent authorities for their special issue because of their conviction that "the greatest problem facing the American library profession [is] the need for qualified research into librarianship." The extent to which this conviction is generally shared is shown by the following typical comments:

Philip H. Ennis: "Library research is non-cumulative, fragmentary, generally weak, and relentlessly oriented to immediate practice."[1]

Robert L. Gitler: "There *is* evidence in the years behind us . . . of effective research studies and projects with resulting applications that most of us are aware of. But how many of us heed these, have made searching inquiry? How many of us, through the literature, know what *has* been done, or have

---

1. *Wilson Library Bulletin*, May, 1967 (hereinafter WLB, May '67), p. 399.

discovered what some of the backgrounds have been to stimulate research in librarianship?"[2]

Sidney L. Jackson: "There has been no rigorous accounting of what research is needed, on what scale of priority, within what organizational framework, or under what commitments."[3]

Ray Smith: "We need research that will show what student and adult service is required if we are to cope with changing educational approaches, technology, and the population mobility that continuously demands flexible library services."[4]

Peter Hiatt: "I do believe that as a profession we have not done enough to support and encourage research."[5]

David Kaser: "No area of library activity has been blessed with even a fraction of the research attention it needs and deserves, and as a result, instead of administering our efforts from the vantage point of sound management knowledge and resulting self-confidence, we have based decisions upon hunch, intuition, and a professional mystique."[6]

The many specific suggestions for research can be categorized in five main areas: (1) Systems, and systems design; (2) Opportunities and problems created by new technology and techniques; (3) Interrelationship of education, information, and library services; (4) Coordination of administration with user-oriented service; and (5) Potentialities of information storage and retrieval. The following paragraphs reflect the views of librarians who believe that there is need for research in each of these areas. The remainder of the report will be devoted to the specifics of _what_ should be included in the research program for each of these areas to assist in the development of small college libraries.

## Systems and Systems Design

Probably the most insistent recommendation among those interviewed, as well as among those who wrote their comments for the

---

[2] _Ibid._, p. 905.

[3] _Ibid._, p. 909.

[4] _Ibid._, p. 912.

[5] _Ibid._, p. 923.

[6] _Ibid._, p. 924.

Wilson Library Bulletin, was the need for the application of systems analysis, and the techniques of cost effectiveness evaluation, to the problems of libraries and librarianship. Some typical comments:

David Kaser, in the article already referred to: "Librarians . . . find themselves in a society that can decipher the Etruscan alphabet, plot with accuracy the Sea of Tranquility, and plumb the intricacies of the DNA molecule, but they cannot say with certainty how much it costs to catalog a book, how to maximize library service in a decentralized system, or what kind of physical accommodations readers need or prefer."[7]

H.C. Campbell: "One reason that new research avenues are not opened up is that librarians do not believe that data about librarianship can be quantified. This is mainly the result of poor training in library schools and poor professional practice. There is no aspect of librarianship that cannot be quantified, and for which mathematical models and simulated work routines cannot be constructed."[8]

Virginia Lacy Jones: "Sounder programs of library education could be developed if all types of libraries could clearly and specifically describe the wide range of tasks that must be performed to enable them to achieve their goals. . . . Perhaps the first step in this direction is detailed analysis of the utilization of manpower, as it now exists, in a sample of various sizes and types of libraries."[9]

## Opportunities and Problems Created by New Technologies and Techniques

There are among librarians two widely divergent views of the opportunities and problems created by modern technology. On the one hand we find the librarians who see in the new developments opportunities to improve and enrich traditional library functions and services. Guy R. Lyle, who does not share this point of view, calls its adherents "technologists" in a recent article.[10] The other viewpoint, apparently held by a majority of librarians, including Lyle, looks with alarm at these new developments, which they believe threaten basic values of librarianship, and of education, substituting impersonal machinery for warm, personal scholarship. Lyle calls those who think this way "humanists," but at least one unsympathetic scholar refers to them as "nostalgists."

---

[7] Ibid., p. 923.

[8] Ibid., p. 911.

[9] Ibid., p. 913.

[10] Guy R. Lyle, "Stress and Strain in Academic Librarianship," Library Journal, January 15, 1968, p. 153.

The issue is presented eloquently by Lyle: "There are two streams of thought in librarianship. . . . The first--seeing the library as rooted in book knowledge with enthusiasm for bibliographical skill as its professional capital--is literary, personal, and contemplative. Its opposite--seeing librarianship as primarily a service agency which must develop smooth-running automata to cope with the growing vastness of knowledge and speed it on its way to the user--is severely technological, impersonal, and empirical. . . . From the 1920s through the 1950s . . . neither /the technologist nor the humanist/ dominated the field of librarianship without the presence in some form of the other. That is, until the 1960s. . . .

"The dominant fact of our time is the burgeoning of knowledge and technology. At the same time, specializations proliferate. The library is viewed as one element in a complex communication system and the pressure is on librarians to produce better and faster ways of organizing and retrieving information if the library is to stay in business. The coordinate status of humanistic-technological librarianship has been eroded. Technology rides the throne and the humanists are in the anteroom. . . .

"Special institutes, conferences, and seminars create a clamor for training in the application of data processing to library technical operations and the use of computers for information storage and retrieval. Information science is industriously thrusting itself forward as a separate professional field, sometimes without even so much as a bow in the direction of librarianship, while library schools are hastening to add courses in library automation. Library writings in the professional journals have become excessively preoccupied with mechanical matters, with systems analysis, environmental carrels, computer-generated catalogs, and with announcements of staggering grants for research in library technology. . . ."

The issue is presented somewhat differently, however, by H.C. Campbell: "Is there a place for libraries in an electronic culture, one of simultaneity, or are they by their very nature trapped in a linear and nonsensory mold that spells their doom?"[11]

---

[11] WLB, May '67, p. 911.

## Interrelationship of Education, Information, and Library Services

Elsewhere, in that same article, H.C. Campbell suggests that the divergence between the "technologists" and the "humanist-nostalgists" may be less important to the future of libraries and librarianship than is a failure to explore the interrelationship between libraries and the transmission of knowledge. Pleading for research into such fundamental matters, he says: "The area that should be of greatest concern to the library profession is the communication of knowledge in all its forms, and the use and enjoyment of such knowledge. . . . Only when we are able to convince librarians that they must raise questions about knowledge in all its aspects outside, as well as inside, the existing structures of libraries will we begin to know more than we now do about the profession of librarianship."

A similar plea is voiced by Mary L. Woodworth: "There is a basic need to question the cherished theories, beliefs, practices, and accumulated folklore of our profession. These customs and practices have grown up through the years, and have come to be accepted by some, sanctified by others, but questioned by a few."[12]

Samuel Rothstein writes: "In an age of mass media, which so often distort and debase communication, the library has a particularly important role to play in the fullest provision of impartial, many-sided information. In an age when information explodes and people must go on learning all their lives, librarians have a particularly important role to play in helping people secure the information they need."[13]

## Coordination of Administration with User-Oriented Service

Peter Hiatt summarizes many of the other comments on the need for more research in the ways in which library administration can best be related to user-oriented service: "We have yet to produce a study on the user's approach to knowledge. . . . Most, if not all, of the current experiments in data processing and computer application to libraries are in the area of technical services, and the use of data processing and computer equipment seems to be for the librarian's, rather than the user's benefit. . . . We can find examples of libraries employing mechanical equipment which increases the user's, not the librarian's, work in registering and borrowing materials."[14]

---

[12] WLB, May '67, p. 947.

[13] Samuel Rothstein, "In Search of Ourselves," Library Journal, January 15, 1968, p. 156.

Similarly, L. Quincy Mumford, Librarian of Congress, says: "Among the general studies relating to bibliographical control I would give first place to the subject of user studies and the need for research on at least two of its aspects: user needs and user habits."[15]

## Potentialities of Information Storage and Retrieval

One of the classic works on the future and potentialities of libraries and librarianship, which has fascinated the "technologists," and presumably has upset the "humanists-nostalgists," is J.C.R. Licklider's Libraries of the Future.[16] Whether or not libraries in the future will look like the image created by Licklider, is not clear. It is certain, however, that the things which he visualizes will exist, in forms not too different from his images.

Many of the technologists believe that if librarians as a profession do not undertake research into the areas pointed out by Licklider, the library function and librarianship as they are now conceived may disappear. This is what Ralph Parker has in mind when he writes:

"During the past few years nonlibrarians interested in documentation and information science have implicitly assumed that the retrieval of information has not been the prime function of librarians for centuries. Although the assumption is patently false, librarians themselves have been, to a large degree, responsible for the misrepresentation. On the one hand they have been too satisfied with the provisions which have been made by libraries cast in the nineteenth century mold to meet the needs of scholars and of general library users of the twentieth century. On the other hand, they have not been willing to understand the gropings of the nonlibrarian or to contribute in harnessing the new technology to meet the bibliographical and informational needs of our society. By so doing, they have given the impression to the outsider that librarianship has nothing to offer. . . .

---

14. WLB, May '67, p. 927.

15. Ibid., p. 926.

16. Licklider, J.C.R., Libraries of the Future, MIT Press, Cambridge, 1965.

"Librarians have been passive toward the information which they handle. . . . Because of this . . . technical information centers are arising as independent and often competing agencies. Research into the most effective organizational structure which can provide for the acquisition, the organization, and the retrieval of informational soucres, and for the effective dissemination of information is required."[17]

---

[17] WLB, May '67, pp. 919-920.

# IV. RESEARCH CHALLENGES AND OPPORTUNITIES

## Organization for Direction, Coordination, and Evaluation

### Research Program Objectives

The ultimate purpose of this study is to design a research program that will facilitate establishment of new college libraries in particular and (to the extent that there is a difference) new college information systems; this program would also contribute to the renovation of existing college libraries and information systems. Such a research program must be based upon a large-scale, comprehensive survey of the college library situation as it exists and the problems and developments in other areas,--such as industry and research libraries--that could have a bearing on college libraries and related resource collections.

This study in itself comprises at least a start toward such a survey, and the necessary identification and discussion of the relevant problems and developments. If, therefore, a decision is made to implement a research program such as that which is proposed in this study, one of the first actions to be taken by the implementing authority should be to determine the extent to which this study suggests adequate objectives for the overall program.

### Machinery for Authoritative, Responsible Direction

A comprehensive research program covering all of the areas that require study, and that are relevant to the establishment of college libraries and information transfer systems, will be meaningless and will result in more of the "non-cumulative, fragmentary" research of which Philip Ennis complains, unless there is a mechanism provided for authoritative, responsible direction, to include means for coordinating the diverse elements of the program, and for constant evaluation of the research program on a continuing basis.

The results of the interview program of this study, confirmed by already quoted comments on the current state of library research, suggest that there is not at present any mechanism in existence which could provide the control, coordination, supervision, and evaluation which would be essential, either for American academic libraries in general, or college libraries in particular. Thus it seems conclusive that the research program will not accomplish its purpose unless a new, strong mechanism is provided.

The British example, with the government Office of Scientific and Technical Information (OSTI) effectively sponsoring, stimulating, and coordinating research would suggest that the mechanism might best be provided by an existing or new government agency. However, a review of the present situation in the U.S. Government suggests that the British example is not relevant. There are, for instance, overlapping and apparently conflicting responsibilities and authority of several government agencies in the field of library research, as the Office of Education, the National Science Foundation, the Library of Congress, and the Committee on Scientific and Technical Information. It is doubtful if assignment of the responsibility for implementing this research program would be undertaken by any of these agencies in the manner required so long as their respective areas of responsibility remain unclear. The establishment of a new committee under any one of these agencies does not offer any greater promise of producing a strong implementing mechanism; this is evidenced by the fact that there is already such a committee in existence--an Advisory Committee to the Commissioner of Education on research and training for libraries and librarianship, set up by the Higher Education Act of 1965.

Thus it seems that the British example is less relevant than one might hope. OSTI is effective not only because the problem is physically much smaller, but even more because the British realize that only through such coordination can they hope to keep up with the more technologically advanced, and wealthier United States. That motivation is lacking in this country.

Yet the existing situation also suggests that it is doubtful if any stronger implementing mechanism can be provided by or within existing private or professional associations or research organizations, such as the American Library Association (ALA), or the Association of College and Research Libraries (ACRL--within the ALA), the Association of Research Libraries (ARL), the Council on Library Resources (CLR), and the American Society for Information Science (ASIS; formerly American Documentation Institution).

It is beyond the scope of this study to develop a structural framework or plan for administrative and technical machinery that would provide authoritative, responsible direction and implementation for an ongoing research program. Yet such machinery is clearly essential if the research program produced by this study is to have any meaning or effect.

A first step in this direction would be for a small group of respected librarians and scholars of librarianship to consider all of the alternative ways in which this machinery could be established, and to submit appropriate recommendations to all interested Government and private agencies, such as those listed in earlier paragraphs. Such recommendations could be prepared by a group of approximately ten carefully selected individuals participating in an intensive workshop-conference for about one week. This workshop--sponsored by the Office of Education's current Library and Information Science Research Program--could include the directors of three relevant research projects already being sponsored by that Program, plus representatives from the five private agencies mentioned in an earlier paragraph (ALA, ACRL, ARL, CLR, and ASIS). These eight participants might also select no more than three additional specialists to join them in this workshop. Representatives of interested Government agencies could, of course, observe.

Among the alternatives this workshop might consider, are the following:

* A Standing Committee on College Libraries and Information Transfer Research appointed by the U.S. Commissioner of Education (see Appendix F); the difficulties of assuring effective implementation of research by such a committee are discussed above;

* Implementation of the program, under Office of Education sponsorship, by a private organization, such as ALA, ACRL, ARL, CLR, or ASIS; again difficulties discussed above must be recognized;

* Support by the Office of Education (or other Government Agency or private foundation) of a Research Institute for College Libraries at an existing graduate library school; such a research institute might have the benefit of guidance from a committee such as suggested in Appendix F;

* Support by the Office of Education (or other Government agency or private foundation) of a Research Institute for College Information Transfer to be established at a small college with a particularly dynamic library program; such a research institute might also have the benefit of guidance from a committee such as suggested in Appendix F;

* Sponsorship by the Office of Education, in cooperation with one or more selected private agencies, of a private and independent ad hoc group or committee, which might be organized along the lines suggested in Appendix F;

* Some other mechanism.

## Systems and Systems Analysis

To assure a sound, consistent basis for control and coordination of the various research projects within a large, comprehensive program, it is essential to establish a requirement for generally agreed missions, functions, and standards for college libraries and information systems. This will demand a detailed systems analysis of college information systems, including libraries. This intensive cooperative effort will involve librarians, non-book media specialists, education specialists particularly concerned with higher education, and competent systems analysts. The definitions, standards, and relationships resulting from this analysis will provide the integrating impetus and a common basis for all other elements of the overall program. The analysis will also provide norms and standards which will be useful in integrating research in other areas related to libraries and librarianship which are beyond the scope of this study.

The systems analysis will have four, major phases: (1) A review of the origins and status of the library as the prototype of academic information systems; (2) A survey of all academic systems which contribute to education by the provision of material resources of knowledge and information, and services related to such resources, in the educational process; (3) Development of a systems analysis methodology applicable to college library operations and operational practices; and (4) Application of systems analysis to continuing research in information transfer.

## The Library as the Prototype Academic Information Transfer System

Regardless of local situations, or local decisions as to the relationship between information transfer media in the educational process in any given college, the library will clearly be the principal element of all academic information transfer systems for the foreseeable future. Furthermore, there will also be some form of relationship between operations to control and organize books and other written materials and those for the control and organization of other information transfer media and processes.

Thus a survey of the origins, history, and current status of academic libraries and librarianship will not only be an essential first step to meeting the requirements identified earlier in this study, it will provide a basis for evaluating the relationships which currently exist, and which will exist in the future, between book collections and collections of other information resources.

History of Library Processes and Operations. The literature of librarianship includes a number of works on library history. These, however, tend to be more narrative than interpretive. There is a widespread conviction among thoughtful students of modern librarianship that a survey of the history of library operations and of librarianship would provide a better understanding of the origins of modern library practices, and thus would also offer a useful basis for evaluating such practices, some of which do not seem to be clearly related to current requirements.

Basic Definitions and Concepts. It is clear from the comments of people interviewed, as well as from the comments quoted earlier in this report from recent literature, that no systematic study of academic libraries is possible without first establishing a common basis for analysis and comparison of library activities and operations. Thus, a prerequisite will be the formulation of a comprehensive, standard terminology which will relate to all academic library activities, and which will apply to all elements of the proposed research program; hopefully such a terminology would be so prepared that it could subsequently be recommended for general adoption by all libraries and librarians in the nation.

Library Missions. As will be seen, there are differences of opinion among librarians and others in related fields concerning many areas and many library problems. There is, however, a general consensus among librarians on the four principal elements in the mission of a college library: (1) Development of an up-to-date collection of books and other media related to the college curriculum and adequate for the normal needs of the faculty and students; (2) Provision of facilities and services which will assure ready access to the collection and maximum use; (3) A system for quick access to sources outside the college's collection; (4) Organization and administration of staff and facilities in order to perform the first three missions efficiently. The continuing relevance and significance of these, and of other possible library missions, should be examined.

## Relationships Between Academic Information Systems

Systems Internal to Library Operations. This would involve a comprehensive survey of current operational practices from a systems point of view. It would include scrutiny of the following:

Traditional Library Operations. A detailed model of a traditional book library would be postulated, and the various *activities related to its functioning as a system would be* described. Its missions and its positive contributions to the college educational process in accomplishing these missions would be described, as well as its problems and deficiencies.

Other Information Systems Operations. Similar models would be made of all other types of college information-resource systems now operational on college campuses. These would include, but not necessarily be limited to, such systems as: audio-visual media from an instructional point of view; audio-visual media from an independent study point of view; computer and data processing systems; specialized communications systems. Each of these would be described, along with contributions, problems, and perceived deficiencies, as in the model of traditional library operations.

Integrated Systems (the extended library concept). A model would be made of a typical, or an ideal, extended library operation, such as is described by Robert Taylor.[18] The treatment here would also follow that for traditional library operations.

Decentralized Library Services. A model would be made of a typically decentralized college library system, in which each department or division has its own collection of books and other resource media, such as tapes, records, and slides. The strengths and weaknesses of such a system, and the reasons for the frequently opposing views of librarians and teaching department members will be described and evaluated.

External Systems. This section of the study would be devoted to a survey of the external information systems to which a college may belong, or to which its library or other internal information systems may belong. Each of the possible external systems will be carefully studied.

Systems Possibilities. In general there are three major kinds of external systems which can be considered: intercollege cooperation; interlibrary cooperation; and regional networks involving multi-unit cooperation. Within each of these three major kinds of systems, there are several possible kinds of system activities, such as: computerization or automation; unit specialization within the system (for instance, one library concentrating on scientific literature, another on the arts, etc.); depository arrangements (in which one library acts as a depository for all little-used items in a group of two or more libraries, or in which different libraries act as depositories for little-used items within certain categories); communications (as for instance by commercial telephone, teletypewriter, special tie lines, radio, etc.); and other kinds of systems activities which might emerge in the course of the research.

Inter-College Cooperation. Models would be postulated of various operational forms of inter-college cooperation, applying one or more of the system activities described in the previous section. To the extent that these cooperative arrangements involve libraries and/or other college information systems, these would be described in much the same fashion as for the internal systems and would be subjected to the same kind of scrutiny.

Interlibrary Cooperation. Many college librarians are convinced that it is impossible for a small college to have

---

18. Taylor, Robert S., Definition, Scope, and Preliminary Program for the Library and Related Activities at Hampshire College, a report dated February 8, 1967, pp. 11-15.

an adequate library program with only its own resources. To the extent that interlibrary cooperation would differ from inter-college cooperation, models would be postulated, described, and scrutinized as envisaged above.

Regional Networks. Under the category of network activity would be considered such activities as those in New England under the sponsorship of the New England Board of Higher Education, in New York under the State University of New York, and in the Pittsburgh region. Models would be made of at least three networks. At least one should be based upon an example which is geographically concentrated, as in Pittsburgh; at least one should be based upon an example which is geographically widespread. The feasibility and the usefulness to small college libraries of the Educom concept would have to be considered in this area of research. Similar consideration must be given to the possible implications of educational radio and television networks.

## Systems Analysis Methodology

Upon the extensive base of information and descriptive analysis provided in the previous section, methodology for the application of systems analysis to college libraries and library operations would be developed.

Despite some tentative efforts recorded in the literature, systems analysis has never been applied upon an overall, comprehensive basis to the operations of college libraries and college information systems in general. The principal reason is evidently a lack of commonly accepted and understood terminology, standards, and procedures which will make systems analysis meaningful. The purpose of this section of the research program is to develop the required methodology, which can be applicable to any college library. The task is a formidable one, particularly in the area of measurement and quantification. Yet there seems to be no reason why, if approached with sufficient determination, and sufficient support from such official and semi-official organizations as the U.S. Office of Education, the American Library Association and (possibly) the regional accrediting associations, the methodology cannot be developed.

The importance of the development of such a systems analysis methodology, and the application to library problems, particularly in the area of cost-effectiveness was stressed by so many of the librarians and other scholars interviewed in this study, that it is believed useful to quote a few typical, and comparable, comments from the research issue of the Wilson Library Bulletin and elsewhere:

Philip H. Ennis: "Lack of standardization of content and method as well as the failure to secure simultaneous application to many libraries prevents comparisons among libraries. Such comparisons are essential for the understanding of how and why libraries vary in their resources and services. . . . Particularly important [is research into] the problem of measuring library performance."[19]

Peter Hiatt: "The lack of sound information necessary for accurate predictions is a serious handicap to library development." Later he adds: "What does a service really cost? When compared to a feasible alternative is a particular service the less expensive way to accomplish the same end?"[20]

Lillian Moore Bradshaw: "No other business, handling the amount of funds currently expended by libraries, could exist without proper measurement and evaluation of its market potential effectiveness."[21]

Dorothy Sinclair: "We need to determine the break-even point, in actual dollar cost, between local provision of materials and request or interlibrary loan service. . . . Many libraries have determined or estimated the unit cost of processing a request or interlibrary loan, but I do not know any system which has taken the further step of determining how many requests for a title or material on a subject, from a single outlet, would justify, on a pure cost basis, the provision of the material at the local library."[22]

Mary L. Woodworth: "I, for one, am tired of collection counts, square feet, stations, and librarians. Such 'research' is simply not good enough."[23]

Robert F. Munn: "Since nobody yet appears to have the slightest idea how to make a cost-benefit analysis of the contribution of the library, few administrators feel justified in straying far from the traditional percentage."[24]

---

19. *WLB*, May '67, pp. 899-901.

20. *Ibid*., pp. 920-923.

21. *Ibid*., p. 930.

22. *Ibid*., p. 939.

23. *Ibid*., p. 947.

24. Munn, Robert F., "The Bottomless Pit, or the Academic Library as Viewed from the Administration Building," *College & Research Libraries*, January, 1968, p. 53.

Drafting a detailed work plan for undertaking the research necessary to solve these problems, and to develop an applicable systems analysis methodology will require the cooperative efforts of an interdisciplinary group of scholars, including one or more specialists in systems analysis. Tentatively, it is suggested that the approach might take the form suggested below:

Library Functions and Missions. All of the generally recognized library functions and missions should be scrutinized; the validity of each should be questioned, and alternative possibilities investigated. For instance, several of the specialists queried in the interview program for this study suggested that they had doubts about the validity and importance of the "main entry" concept for cataloging books.

Operations and Operating Efficiency. The various models postulated in the earlier section of this portion of the program would all be examined in great detail with a view to determining the bases for most efficient operation, and for overcoming obstacles to efficiency. In this connection, the degree to which actual library practice differs, or seems to differ, from library school theory should be ascertained, and the reasons for any such difference determined. One or more computerized models may have to be prepared as a basis for computer analysis of the models, in terms of their operating efficiency alone, and in relation to the other systems to which they must be related in the college environment.

Measurement and Statistics. One of the purposes of this portion of the study will be to establish standards for library statistics, and to formulate means for measuring and quantifying library operations. From existing data, and from the models, tentative standards and means of measurement can be postulated, subject to future refinement. These can be tested, in the course of the research, against actual operations in two or more colleges selected at random.

Cost Effectiveness. The application of the postulated statistical standards and measurement norms against the operations of the models developed earlier, combined with the testing of these standards and norms on some typical small college library operations, should provide a basis for accurate and reliable cost analysis of college library and other college information systems operations. This will result in the development of an analytic tool of the utmost importance to all college administrators.

Predictions and Projections. The results achieved in the preceding sections of the proposed research activity should also provide a basis for projections for future planning far more reliable than any means currently available. In this section of the study efforts will be made to develop appropriate methodology to this end.

## Continuing Research in Information Transfer

There are in existence today several research institutions devoted to continuing library research in relation to academic libraries. All such research activities appear to be devoted almost exclusively to the requirements and problems of university, or research, libraries, and not to college libraries. Obviously the results of research on information transfer for graduate research libraries is to a considerable degree applicable to undergraduate libraries. However, it is believed that there is need for systematic and effective research into the special problems of undergraduate college libraries and information systems.

Requirements of Small Colleges. The difference in requirements of a small college library and a research library or a large university library would be investigated carefully. Although there is general agreement that there are differences, these have not been clearly defined.

Opportunities in Small Colleges. Another hypothesis of the researchers developing this program is that the problems of a small college library, and of information transfer within a college, can best be evaluated in a small college. This, like the question of requirements, demands objective study. The systems analysis methodology developed earlier should facilitate this specific investigation.

Role of Government. One of the problems of small colleges in the area of information transfer is that of limited resources. The example of the role of the government in the United Kingdom in maximizing limited resources through centralized coordination of a widespread, and otherwise unfettered research program, deserves further investigation.

Another aspect of the role of government in relation to continuing research is the current difficulties which exists in the United States as a result of conflicting and overlapping authority and responsibility of various government agencies with respect to communications and information transfer.

## Opportunities and Problems in New Technologies

The greatest force for recent changes in education, and particularly in the relationship of libraries and other information transfer capabilities to the educational process, has been new developments in technology. New means of doing things, or of accomplishing missions have become available and at the same time educational content has required adaptation to reflect the technological revolution. Both of these aspects of the impact of technology on education must be considered in the development of the research program.

As noted in Section II, above, new technology has had an impact on information transfer in general, and the library in particular, in four principal forms: Non-book (or audio-visual) media, reprography, miniaturization, and automation. This portion of the long-range research program would be devoted to a survey of the current status, opportunities, and problems involved in the application of each of these media or processes to information transfer. It would also consider the way in which cooperative research with industry might be useful for enhancing the contributions which each of these technological forms can make to the educational process in the area of information transfer.

### Man-Machine Relationships

The Practical Problems of Adoption. History provides a wealth of examples of the long, and usually painful, process of the adoption and assimilation of new technological developments, and related techniques, in various fields of human endeavor. From these examples it is evident that there is an important distinction to be made between the adoption of a new technology and its assimilation into established operational systems.[25] It is clear that modern education in general, and modern academic libraries in particular, are currently suffering from the problems inherent in both the processes of adoption and of assimilation. It is believed that through organized research these processes could be expedited and made more efficient, while the problems could be reduced in number and in complexity.

---

[25] See, for instance, Historical Evaluation and Research Organization, Historical Trends Related to Weapon Lethality, Washington, 1964, particularly Chapter IV, and Annexes III-A, III-B, and III-C.

Three principal areas of exploration are envisaged as being relevant to the process of adoption of a new technological development, and the practical problems which are involved. First there is the question of relating or adapting the new developments to old or existing practices and methods. Second there is the possibility that a new technology or item of equipment will open up conceptual possibilities hitherto unthought of, or eliminate difficulties which had been assumed to be inevitable. Finally, there is the question of hardware deficiencies during early stages of any adoption process; if the nature of a deficiency is not understood, it can have an unfortunate and unnecessary impact not only on the adoption process, but upon that of assimilation as well.

The Psychological Problems of Assimilation. There is an inherent human resistance to change. Even the successful adoption of a new technological development, and proof of its value to a profession, is often of little significance in having it accepted by the profession, and in the restructuring of methods and procedures so that the new development fits into an efficient, functioning system.

There is also a phenomenon which can be ascertained in the assimilation process in some instances, which could be called "over-sell." This is when a new development has implications that are so obviously beneficial or practical that a substantial segment of the profession assumes that the mere adoption of the item assures its automatic and near-immediate assimilation. Unfortunately this can be followed by a counterreaction when practical problems and inevitable hardware deficiencies reveal that the assimilation process will be neither quick nor easy; this counterreaction can actually result in resistance, further delaying and impeding the assimilation process. Library automation seems to be currently suffering from this phenomenon of "oversell."

## Non-book (Audio-visual) Media

The existing audio-visual media--sound or audio transfer, visual transfer, radio and television--would be surveyed, to ascertain current and potential applications to information transfer, from the standpoint of independent study as well as of instructional aids. In this portion of the research program the opinions of technical specialists and hardware manufacturers would be sought to ascertain the possibility of the emergence of new media or processes.

## Reprography

With the possible exception of automation, no new technology has had so profound an effect upon information transfer in general, and library service and operations in particular, as the newly developed means of reprography, which is here defined as: "Relatively rapid, convenient, and inexpensive means for more or less exact duplication of a graphical image (writing on a piece of paper, a page of a book, a photograph, etc)."

A survey would be made of the status of reprography in educational information transfer. The potentialities of such applications as "on demand reproduction" would be considered, as well as the problems involved in such applications. The most serious of these problems is that of copyright, which will require very serious and careful attention within the overall research program, possibly as a separate subject.

Also to be investigated will be the techniques and applications of facsimile transfer, which is, in effect, a combination of reprography with visual transfer media. This portion of the project will also require close coordination with that on automation, because of the potentialities of applying computer technology to visual images on a cathode ray tube (CRT).

## Miniaturization

Although miniaturization technology has been applied in a number of ways to library and related information transfer operations for a number of years, it is still being developed. Thus an intensive survey of trends, opportunities, and potentialities in this area is essential.

The techniques to be covered in this portion of the project would include minitext, the various kinds of conventional microform (roll microfilm, microfiche, aperture cards, microcards, etc.), and ultra-microform. Also of importance will be a consideration of the marriage of miniaturization and reprography through reader-printers and emerging techniques of facsimile transfer of microforms.

## Automation

In the light of proven applications of computers to library and other information transfer activities, and the additional tremendous potentialities (some obvious, some only surmised), automation is perhaps the most important area of research for a long-range research program. It also is perhaps the most immediately urgent, because of the difficulties which are being encountered in establishing operationally viable systems. It is beyond the scope of this report to discuss these difficulties, which are properly topics for the research program herein presented. Four principal subject-areas are currently envisaged as being required within this general research field.

Current Role of the Computer in Information Transfer. A survey would examine the already-proven applications both in terms of improved administrative operations, and in terms of conceptual innovations now made possible through automation.

Trends and Opportunities. Current experimental applications would be explored, and implications assessed. The opinions of leading computer and information systems specialists would be sought regarding likely developments. This exploration must avoid wishful thinking, and concentrate on those applications which appear to be clearly feasible in the foreseeable future.

Problems and Deterrents. An intensive, objective, and critical examination would be made of failures, shortcomings, and disappointments in the application of computer technology to information transfer, with a view to ascertaining the reasons for them, and to making recommendations as to how the problems and deterrents can be overcome, or how expectations can and should be brought more closely in line with reality.

Alternative Facilities Possibilities. There appear to be two main means of providing computer facilities to academic campuses: small on-campus facilities, and shared-time computer service. These alternatives are currently being studied intensively in a number of places. However, the impact of both alternatives on library and related information transfer operations should be considered as a specific project within this overall program. This examination would also include consideration of the organizational relationship between computer facilities and services available on campus, and the facilities for information transfer (including the library).

## Cooperative Research with Industry

Cooperative research with industry by those responsible for academic information transfer activities is important. It is clear from recent developments in special libraries and in industrial information centers that much non-college experience is transferrable to academic operations. Means should be developed whereby such experience can be made more immediately useful than is now generally the case.

There is, of course, a mutuality of interest in any new developments in information transfer. While academic research cannot appropriately be undertaken for the purpose of financial gain by industry, academic researchers must realize that the hardware applications are very often immediately beneficial to education.

Finally, there is a need for a thorough exploration of the opportunities and problems which exist in such cooperative research.

## Interrelationship of Education, Information, and Library Service

### Theoretical Premises

New educational technology, and the new concepts which it has largely stimulated, have raised some fundamental questions about education, teaching, and learning. For instance, to what extent is education the process of teaching, as opposed to the process of encouraging and stimulating learning? Attempting to seek answers to such questions is far beyond the scope of this study, and indeed such questions have significance transcending a research program in the area of libraries and information transfer. But, if there is no authoritative and generally accepted answer to such questions, answers must be found, or premises postulated, as a major factor in the overall information transfer research program, since, in any event education is largely dependent upon information transfer by means of books and other informational resources.

The Nature of Education. Several scholars interviewed in the study expressed the opinion that there is need for a serious exploration of the nature of education, or the philosophy of education, as related to both teaching and to learning, as well as to knowledge and to information. As suggested above, this topic to some extent transcends in importance all else in this research program.

The Nature of Information and Knowledge. An equally fundamental exploration is required to determine what we really mean today--the 1960s and 1970s--by the concepts of information and knowledge, and the extent to which these concepts are synonymous and interrelated. The difference between factual information and conceptual information must be clarified. The validity of generally accepted and largely intuitive assumptions regarding these concepts requires rigorous scrutiny. The extent to which the new technology can help to provide information, without impairing or reducing the intellectual exchange necessary to transmit knowledge, must be investigated.

Motivation to Obtain Information. The essentially philosophical inquiries undertaken in the two previous sections of this project must be related to each other and to practicality. We need to determine how and why students are motivated to go to the library (or to other collections) to obtain information. The ways in which students can be motivated should be explored and examined.

## Image and Self-Image of the Librarian

It is clear from the survey, and from library literature, that many academic librarians are uncertain about the role which they should play on their campuses. One encounters considerable and understandable nostalgia for earlier, and simpler, times when librarians needed to concern themselves only with books. The nostalgic librarian, furthermore, believes that the traditional orientation of his profession has been scholarly rather than administrative. In the light of the varied expression of views encountered, and the frustration expressed by so many librarians, it is not only essential to the objectives of the research program to explore this question, it is professionally important as well. Advantage should be taken of the research done earlier in the history of libraries and librarianship.

The Librarian as a Scholar. To what extent is there a logical basis for the nostalgia noted above? Is the librarian really a faculty member, or is he essentially an operating service administrator?

This question of the relationship of the professional library staff to the teaching faculty is unquestionably one of the great issues affecting the future of librarianship in the minds of a majority of librarians. Guy R. Lyle summarizes librarian viewpoints frequently heard during the course of this study: "There was a time when librarians were scholars and scholars were librarians and the question of status never arose. . . . The change from the scholar-librarian to the administrator-librarian took place . . . well into the 1920's. . . . The new librarian's approach was businesslike, pragmatic; in his eagerness to relate the library to instruction he exploited every possible angle of library service that looked promising. . . . 'By the very excellence of the service he provided,' writes Julian Boyd, 'the librarian paradoxically devalued his profession in the eyes of the academic world. . . .' Here and there the penumbra of uncertainty regarding the librarian's place in the college community has been eased by the soothing solvent of an academic paper title, but the question of status remains a source of frustration and concern to many. . . .

"Librarians participate in retirement, group insurance, and health plans, but these benefits and others such as college education for children, travel allowances to professional conventions, and supported leaves of absence for study and public service are seldom spelled out for librarians. No such vagueness as this is permitted in the faculty ball park."[26]

These complaints were discussed with one senior university administrator who was formerly a university librarian. He suggested that the librarian be given the title of "Dean of the Library." At first blush this might appear to be the "soothing solvent" which seems less than satisfactory to Lyle. But the librarian-turned-vice president pointed out that the granting of such a title should not be an empty gesture. It should reflect the fact that, like other deans, the librarian is both an educator and administrator; he and his professional library staff should be accorded all the rights and privileges of the professional educators in the staffs of deans and assistant deans.

A comparable suggestion was recently offered by Foster E. Mohrhardt: "Among the most interesting of the new titles designating the chief librarian in universities is that of vice-president for communications. This, too, reveals a realignment of activities within the library and also some of the changes in the services of the library itself."[27]

The Librarian as a Service Administrator. It is doubtful if any responsible academic librarian would wish to avoid administrative and service responsibilities. But should these responsibilities be the most important in the role of the librarian?

Librarian Service Initiative. Some librarians, who might be termed "activists," believe that it is the task of a librarian to seek incessantly to improve service for their clientele--mainly faculty and students. The other school of thought--which might be labelled "responsive"--is not opposed to service as such, but tends to view the efforts of the activists as involving much wheel-spinning, with change largely for the sake of change; indeed, some responsivists believe that spoon-feeding by librarians impedes the educational process. These issues should be explored on the basis of cost-effectiveness, if for no other reason.

---

[26] Op. cit.

[27] Mohrhardt, Foster E., "The Office of the Librarian," Wilson Library Bulletin, December, 1967, p. 395.

## Role of Information Systems in the Educational Process

It is evident from the above discussion that there is less than complete unanimity among librarians as to the role of the library in the educational process. While related to, and to some extent following from, an exploration of the librarian's image and self-image, the question of the role of the library and of other information systems in the educational process is far broader in scope, and is fundamental to the objectives of the overall research program.

Relationship of Library to Other Information Resources. There is great similarity in the missions and services of academically useful resources of information in book form, and those of academically useful resources in other forms, such as the audio-visual media. The extent of the similarity, and the possibility that there may even be some identity, needs clarification. At present on too many campuses there appears to be unnecessary competition and duplication of effort between book librarians, on the one hand, and those specialists who are involved in what is often called "instructional services," on the other. At the same time there are, on many other campuses, serious deficiencies in services and available resources because of lack of realization that there is a similarity in function and mission of those who organize and control access to the various informational resource media.

There does appear to be one important difference between the academic utilization of books and that of the other media. Books essentially perform their information-transfer function through an independent, individual process (in this case, reading). Most of the audio-visual media have the same potentiality of transferring information directly to an independently listening or viewing individual. Yet they also have the additional potential of assisting in the teaching process (as opposed to the learning process) through graphic, dramatic, or other sensual impact. There needs to be an exploration of (a) how important this difference is, (b) the extent to which it requires a different attitude and approach in organizing and controlling the resource, and in providing service to users of the resource, and (c) how the resources and the services based upon them are to be coordinated.

Use of Collections for Learning. There should be examination of ways in which the various resources collections of the library and other elements of the college information system can be employed to foster independent study and to encourage individual progress. This examination should consider concepts, techniques, and facilities.

Use of Collections for Teaching. This would be a similar examination of the manner in which the various information media available on the campus can be organized and applied to teaching. An important part of this examination will be a survey of the various kinds of facilities and techniques which are being employed and the potential adaptations of such facilities and techniques. Also important will be the role of instructional services personnel in guiding, and in providing assistance to, the teaching faculty.

Orientation Courses. Most librarians believe that there is a need for more and better student orientation to library resources than is now generally available. Yet most will also agree that such courses in library use are all-too-often time wasters, and rarely effective. Thus there is patently a need for investigation of the requirement for instruction and the problems and deterrents which seem generally to inhibit the effectiveness of library orientation courses or programs. There are enough apparently successful examples in this country and abroad (specifically in Denmark and Great Britain) to warrant surveys to ascertain the extent to which they exhibit common features, the extent to which they really meet a requirement, and the manner in which they avoid or solve the problems which so often act as deterrents. This area of research should seek imaginative alternatives to traditional library orientation methods.

## Learning Centers and Their Problems

There is a growing trend toward the learning-center approach as a pragmatic means of assuring an effective integration of libraries and other information resources into the educational process. In some instances the learning-center approach is formal and accomplished through organizational integration. In others much the same effect is accomplished through informal coordination and cooperation among librarians, directors of instructional services, and faculty administrators. In the course of this study, four organizationally integrated learning centers were visited, as were four institutions which had what might be termed "informal learning centers." The questions and issues suggested for research in this area of the overall program are based upon this observation.

Kinds of Learning Centers. Aside from the question of organizational integration, learning centers vary primarily in terms of orientation toward a library operational and service approach or an instructional media operational and service approach. To some extent this is a reflection of personalities. It can also be a reflection of administration predilection. A number of the existing learning centers should be surveyed, and the results subjected to systems analysis.

Subject Materials. The most serious and most common problem encountered in all of the formal and informal learning centers visited was that of subject materials in non-book media. The general complaint was that the various audio-visual materials are inadequate in both quantity and quality. Materials available from external sources show wide variations in quality (mostly poor), and are not readily adaptable to the individual requirements of the professors. It also seems to be difficult to establish a really efficient and timely acquisition procedure. Yet there are almost equally serious problems connected with the preparation of materials locally. These are often crude in comparison with sophisticated commercial recreational audio and visual materials with which students are familiar (records, radio and television programs, motion pictures, etc.). Yet both time and facilities (and possibly talent) are usually lacking to produce materials of the desired quality that **are** specifically tailored to local requirements.

Danger of Inhibiting Independent Study. Without exception the formal and informal learning centers are dedicated to the objective of fostering independent study and encouraging individual progress. Yet the procedures for making materials available to students were such, at least in some instances, that students could be easily satisfied with the specific materials made available to them by their professors, and were given little incentive to look elsewhere for other sources of information or ideas. This would suggest that there is a danger that unimaginative adoption of the learning-center approach will lead to spoon-fed education. This possibility and its dangers should be explored, and antidotes developed which will encourage teachers and students to seek exploration in all available resources, book and non-book.

Applicability of Programmed Instruction. The learning-center environment appears to be particularly favorable to the application of various forms of programmed instruction. There should be exploration of the efficiency of the several forms of programmed instruction in making use of available resources, book and non-book, to foster independent study and encourage individual progress.

Study Habits and Facilities. It is evident from the literature that there has been some research into the effect of environment and facilities on study habits and the efficiency of study. It does not appear, however, that results of such research have been definitive. Meanwhile, in the various formal and informal learning-center institutions--and others as well--the nature and quantity of study facilities provided appear to reflect predilections and personal experience of decision-making administrators rather than scientific research results. In some colleges there is an effort to provide attractive study facilities in the dormitory areas; in others, students are subtly encouraged to use the library or other centralized study rooms or laboratories; in a different approach, students are overtly urged to do all or most of their studying in permanently assigned carrels in the learning center. There is obviously need for a research project in this area utilizing both human engineering research and systems analysis.

## The Library-College Movement

The basic objective of the Library-College Movement among academic librarians is to achieve a more intimate involvement of libraries and librarians in the educational process. Its adherents believe that it is the wave of the future in librarianship. Some critics, however, believe that it is only a manifestation of unrealistic nostalgia for the "good old days" of librarian scholars, and reflects dissatisfaction with prevailing faculty attitudes toward librarians. Whichever point of view is the more accurate, the movement is both widespread and significant. Even its critics are generally in favor of the objective, and most think that from the movement will come something (probably other than a library-college) which will contribute to a more fruitful relationship of libraries and the educational process.

Origins and Nature of Concept. The origins of the Library-College Movement should be explored in order to ascertain the extent to which it is a response to librarian frustration. The basis for most criticism is that despite a growing literature about the theoretical library-college, there is a lack of specificity and realism about the movement and about its functional objectives. Ways and means of accomplishing its generally approved objective can best be formulated by inquiry into the motivations of the founders of the movement.

Ideals and Practicality. The practicality of the movement can perhaps best be ascertained by creating a theoretical model of a library-college, based upon the ideals and concepts which can be found in the literature noted above. This model can then be examined by an interdisciplinary group of experienced librarians and teaching faculty members. Adherents of the concept should be included in this group.

The Reference Staff Alternative. Librarians who have expressed doubts about the practicality of the library-college movement, have suggested that a more practical method of accomplishing the objective might be to create a much larger reference librarian staff, with each reference librarian holding an appointment within an academic department or division, as well as being a member of the library staff. One or more theoretical models of a library and faculty so organized should be developed, for study and for comparison with the library-college model suggested within the previous section.

## Coordination of Administration with User-Oriented Service

### The Concept of User-Oriented Service

Libraries and other collections of information resources will always have to provide service. They will also inevitably be concerned with problems of administration, in order to be able to provide the service. During the course of the survey program for this study, some faculty complaints were heard that librarians tend to handle library administration for their own operating convenience, rather than for the convenience of the user. Some librarians agree with the criticism. The fact that there are such complaints, no matter what the justification, suggests the need for investigation with a view either to correcting the causes of complaint, or to assuring more understanding of the problems of the librarian on the part of library clientele.

Library Missions and Priorities. An interdisciplinary group of librarians and other academic scholars should review the missions and functions of the library, and should establish priorities that reflect awareness of the needs and obligations of both library staff and teaching faculty.

Attitudes of Library Staff and Library Clients. Based upon the missions and priorities established in the previous section, and bearing in mind the related research on the image and self-image of the librarian, a survey should be made of attitudes of librarians and of library clients toward each other, leading to recommendations which will improve mutual awareness of the sometimes conflicting requirements of library staff and library clients.

### Evaluation of Administration and Service Efficiency

Any operation responsible for providing service should include automatic procedures for evaluating the efficiency of the service. Research in this area should be coordinated with that dealing with systems analysis, particularly the portion concerned with statistics and measurement; without reliable statistics and effective means of measurement the evaluation procedures can never be fully effective.

Procedures. It will be necessary to develop evaluation procedures. These should include tools and techniques for internal self-evaluation, as well as for periodic inspection and evaluation by outside specialists or consultants. These procedures should include provisions for automatic responses to correct deficiencies, and to carry out recommended changes and improvements in service and in administration.

User Surveys. The results of the survey for this study suggest that there is not enough effort upon the part of the average librarian to learn the patterns of library behavior of his clients, or to determine their interests, or to ascertain their requirements. Instances were noted where special surveys by imaginative "activist" librarians were able to discover among their teaching faculty patterns of behavior, or requirements, or deficiencies in understanding library capabilities, which the faculty members themselves did not realize. The results in some instances were not only an improvement in library service, but also improved teaching.

The whole question of user surveys should be explored, in order to ascertain what the potentialities can be, and to set objectives for the use of such surveys by librarians and those responsible for other collections of information resources. The limitations of such surveys, both in terms of practical feasibility and useful application of results, should also be explored.

## Employment of Part-Time Student Help

Considerable attention was paid in the interviews to the question of the employment of part-time student help. There appeared to be a consensus among librarians regarding some aspects of this question and wide differences of opinion in others. In most academic libraries in this country, student help comprises a substantial portion of the library staff. There are two principal reasons for this: such employment provides a means for the college administration to grant financial assistance to students who might otherwise not be able to afford college expenses; and the cost of student help is considerably less than would be the cost of employing other persons of comparable intelligence. Furthermore, there is an obvious educational benefit to those students who are at all serious in their work in the library.

The problems, however, are often substantial. Librarians complain of high turnover, excessive time spent in supervision and training, lack of reliability, and the like. Some believe that the benefits--particularly in recruitment for the profession--warrant the time and effort required to cope with these problems. Some do not.

What is required, then, is a survey of practices and policies in college libraries where students are employed on a part-time basis, to ascertain the various ways in which this is accomplished, and to determine the advantages and disadvantages under different circumstances. This survey, then, should be the base for a cost-effectiveness analysis.

## Centralized and/or Packaged Processing

Application of Systems Analysis. Either within the systems analysis methodology study recommended as an earlier phase of the research program, or as a separate but related project, a survey of practices and costs of processing materials (books and other information media) is suggested. There appear to be two alternative means of reducing the currently rather high costs of processing through centralization and specialization: cooperation among a group of libraries; or commercial processing. Both of these should be explored, and should be compared for relative cost-effectiveness.

Implications of the MARC Project. Although the Library of Congress MARC project will be the subject of extensive evaluation by the Library of Congress, the American Library Association, the Office of Education, and probably by others, further evaluation should be made within the context of this research program, to ascertain its implications for the processing costs borne by small college libraries.

## Budgets and Operations

Effect of Budget on Services. Several librarians have pointed out that one of the principal factors affecting user-oriented service is the adequacy or inadequacy of the library budget. If the budget is not sufficient to permit efficient operations--including required services as well as normal administration--something must suffer. Inevitably the first thing to feel the pinch will be service to users, because all librarians will assume that their primary responsibility will be to keep the library at least minimally operational, even if all customary services cannot be provided. Making use of the related research in cost-effectiveness of library operations, discussed earlier, the specific implications of budget shortages should be determined to provide guidance not only to librarians, but to college administrators as well.

Operational Policy and Procedure Guidelines. In the course of this study it has become evident that one aspect of library operations that will inevitably be affected by budget inadequacies is the preparation and maintenance of written library policy guidelines to cover all aspects of library operations and administration. Library schools emphasize the importance of such guidelines, elaborated in considerable detail. Yet library school professors complain that even those that do exist are rarely kept up to date.

The principal reason that operating librarians offer to explain this failure is that the requirements of administration and service do not permit them to take the time to prepare and maintain such policies. Guidelines are among the first things to be neglected in a situation of austerity or penuriousness.

Whether the need for such guidelines may not be so great as the library school professors have indicated can be determined only by survey and evaluation. The cost of maintaining written policies should be determinable through systems analysis. The availability of a firm cost figure, plus an assessment of the importance of the practice, will permit librarians and administrators to have a clearer understanding of the implications of including or deleting funds required to prepare and maintain such documents.

The Budget and Acquisitions. It is doubtful if any college library will ever have sufficient funds to acquire all of the materials (including all media, not just books) in every subject that every faculty member wants (or should want). One of the most difficult problems of librarianship is to make certain that the available funds are allocated equitably to meet the requirements of every department and division, as well as the general bibliographic needs of the library.

Procedures for Selecting Materials. There is no greater test of a librarian's diplomacy than in the establishment, and equitable management, of procedures which will permit all of the faculty to have a say in the acquisition of materials. At the same time, he must use his own judgment as to the awareness of faculty members regarding materials availability in comparison to the knowledge of the new literature and other materials among members of his own library staff, whose duties require them to remain abreast of new materials.

Formula for Allocating Funds. A formula must be developed for the allocation of funds to acquire materials to support the curriculum. This formula cannot be a direct relationship between class enrollment and funds, otherwise relatively unpopular but academically significant courses will be so deprived of funds that the quality of their offerings will be affected, which could have an adverse effect upon the quality of the entire school.

## Information Storage and Retrieval Possibilities

### History and Trends

Traditional Library Approaches to Information Retrieval. Information storage and retrieval is nothing new to a librarian. The basic distinguishing features of a library--organization and control--are expressly intended to permit ready retrieval of stored information. And while, in terms of modern technology and techniques, this may be a rudimentary form of information storage and retrieval, the librarian is also intimately familiar with a much more precise tool of information retrieval: the book index. No one has yet devised, however, an efficient means for seeking and finding, for retrieval purposes, an index reference in a book among thousands of books.

Meanwhile, in recent years there have been developed a number of techniques for organizing, storing, indexing, and retrieving vast stores of quantitative or quantifiable information. Computers can do the job efficiently in very large stores of this kind of information; other less expensive and less sophisticated techniques can be used where the data bank is not too massive.

Efforts to apply comparable techniques to qualitative, conceptual information, such as is contained in most books (particularly in the social sciences and humanities), have not been very successful to date. And so the gap persists between the library subject catalog and the individual book index, a situation that is frustrating and tantalizing to both librarian and information systems specialist.

The "Information Explosion" and the Communications Problem. The principal reason for the sudden interest in the concept of information storage and retrieval has been the so-called "information explosion" of the last two decades, in which the proliferation of published (and unpublished) written material has been so great that scholars and specialists have suddenly found it impossible to keep up with important documents relating to their professions. Much has been written about the information explosion, which was, for instance, the principal reason for Licklider's study of Libraries of the Future.[28] It was the topic of an entire issue of a recent quarterly journal.[29]

---

[28] Op. cit.

[29] "The Information Deluge," The Johns Hopkins Magazine, Fall, 1967.

The new technologies have, of course, greatly stimultated the information explosion, and the computer in particular has been blamed for creating a situation in which scholars are drowning themselves in their own intellectual output. But, as Martin Greenberger has written, "the real villain in the information explosion is not prolific computers or prolific authors, so much as it is poor communications.... More people want and need more facts about more things today than at any prior time in history; yet the mechanisms for routing information are inadequate relics of a bygone age. Much of what is circulated and distributed at present is either not read or not relevant to the person who receives it."[30]

Fortunately, however, the computer and other new techniques can perhaps provide the solution, or a variety of solutions, to the information explosion, as Licklider, Greenberger, and others suggest. This particular research project can review these suggestions, and perhpas provide others.

## Requirements and Goals

There is no reason to believe that the gap between library subject catalog and book index cannot someday be eliminated. Most people familiar with information storage and retrieval assume that it will be--although not necessarily through the use of individual book indices. But the solution is certainly beyond the predictable future.

To help bring the solution closer to reality, there is a need for librarians and information systems specialists to work together. This need is well understood, and is being acted upon, in many places. The contribution that can perhaps be made in the context of this long-range research program is to investigate how improved information storage and retrieval can serve the requirements of increased integration of education and of information resources on the college campus. The need for a capability to retrieve qualitative information is perhaps greater in the educational process than it will ever be in industry, where the emphasis is on quantitative and quantifiable information retrieval.

Thus, as an element of this research program, there is a clear opportunity to evaluate the requirements for qualitative information storage and retrieval, and to set goals which will help to bring the potentiality closer to reality. At present, requirements need to be examined and goals set in at least three specific areas: (1) book and document retrieval; (2) selective dissemination of information (particularly to the faculty); and (3) direct access to information content of books and documents.

---

[30] Ibid., p. 29.

## Possible Research and Development

Once general requirements and goals are set, there will be three areas in which this research program can contribute to achievement of the goals. The first will be through the efforts on one or more college information transfer research centers, such as have been discussed earlier (see p. 35. Another will be through cooperative research with industry (see p. 37). And finally, in the course of this extensive research program considerable qualitative (as well as quantitative) information will be amassed. It is likely that pilot projects for the most efficient use of this information can contribute directly to the general goals of efficient retrieval of any and all materials contained in college information resources.

## Specifics of Establishing a New College Library

The final portion of the research program will relate earlier elements to the specific problems of new college libraries. It must be borne in mind that no final conclusions can be reached, since each library will be conditioned by basic problems of availability of funds, the physical relationship of the library to other facilities in the master plan of the college, the size of the campus, the number of faculty and students, and the size of the library staff.

### Operational Philosophy

Three principal and fundamental decisions must be made for each library at an early stage in the planning development: selecting from among appropriate conceptual alternatives; determining the nature and extent of technological orientation; and deciding upon the most suitable and useful relationships to be established with other institutions.

Conceptual Alternatives. Will this be a traditional Library? will it conform to the extended library concept? will it be an element of a learning center? will a library-college approach be adopted? These appear to be the major, and not mutually-exclusive, alternatives to be considered.

Technological Orientation. Consideration must be given to each of the major new technologies which have had such a profound effect upon the academic library world: audio-visual, miniaturization, reprography, and automation. To what extent will each of these play a part in the new library? The decisions in each case will have a bearing on other decisions, and particularly those of the preceding section (conceptual alternatives).

A number of sub-decisions will be required with respect to each of these technologies. For instance: In the audio-visual area, will a dial access system be installed? In miniaturization, to what extent will microfrom be used to build up the basic collection of the new library? In reprography, should there be an institutional policy with respect to the danger of copyright violations? To what extent should automation be applied to library operations at the outset? These are only sample questions that must be surveyed; the manner in which this is done and the efforts evaluated should be suggested in this section, using earlier research results as a guide.

Relationships with Other Institutions. There is reason to believe that many important decisions on construction, hardware, policy, budgets, staff, procedures, and the like, will depend on the manner in which the library will expect to participate in cooperative activities with other institutions and libraries. The validity of this hypothesis should be investigated. If it appears justified, then guidance should be provided on the manner in which the various possibilities should be assessed, with the implications of each decision being clearly understood.

### Organizational Relationships

With the Administration. The matters on which guidance should be provided include such things as chain of authority and responsibility, and budgetary procedures.

With the Faculty. Are members of the professional library staff to be considered as full-fledged faculty members? Why? Or why not? In particular, the role of the library reference staff in relation to the teaching faculty must be carefully considered, particularly if the alternative to the Library-College movement (discussed on p. 44) is considered. This section of the project should also deal with such operational relationships as book acquisition and library orientation.

With Instructional Services. Regardless of which of the four conceptual alternatives is adopted, it must be recognized that the factors affecting the relationship of the library to instructional services might influence the decision on conceptual alternatives, and so these two research projects should be coordinated.

With Computer Facilities. It must be determined whether or not a special library-computer relationship should be established; the possibility must be considered of including both as part of an overall information systems complex in the college, whetehr or not the learning center approach is adopted. The possibility of separate and independent computer facilities for the library must also be considered, particularly if it is planned to move promptly and significantly into library automation.

### Practical Planning Considerations

An exhaustively compiled and annotated check list should be dev developed covering all of the practical planning matters that must be determined. Many, but not all, will depend upon the decisions which emerge from the consideration of the materials to be produced in the previous sections of this research project. Among major items to be included in the compilation are the following:

Size of Library Holdings. The library may be expected to include such resources as: books and periodicals, microforms, paintings and art reproductions, art slides, recordings, and other media. The most critical part of the guidance will be to suggest the best use of available funds.

Facilities and Equipment. The optimum size, nature, and design of such items as the follwoing must be carefully considered: carrels (electronically equipped and plain), other study facilities, typing rooms, reading rooms, conference rooms, listening rooms, dial access for audio-visual media, reprography facilities, automated shelving and book retrieval systems, etc.

Construction Plans. In addition to the various decisions on matters such as those listed above, such matters as availablitiy of funds, master plan relationship of the library to other facilities, size of campus, size of staff, number of students, etc., must be considered in a very complex and time-consuming process.

# V. CONCLUSIONS

## A PROPOSED RESEARCH PROGRAM OUTLINE

Based upon the considerations discussed above, the following is proposed as the outline of a long-range, comprehensive, coordinated research program for the design and development of new college libraries:

A. Organization for Direction, Coordination, and Evaluation

1. Research program objectives
2. Machinery for authoritative, responsible direction of the research program

B. Systems and Systems Analysis

1. The library as the prototype academic information system
    a. History of library processes and operations
    b. Basic definitions and concepts
    c. Library missions
        (1) Up-to-date collection of resources
        (2) Facilities and services for satisfactory use of collection
        (3) Quick access to sources not in collection
        (4) Organization to perform first three missions
        (5) Other?
2. Relationships between academic information systems
    a. Systems internal to the college
        (1) Traditional library operations
        (2) Other information systems operations
        (3) Integrated systems (the extended library concept)
        (4) Decentralization of library services
    b. External systems
        (1) Systems possibilities
        (2) Inter-college cooperation
        (3) Inter-library cooperation
        (4) Regional networks
3. Systems analysis methodology
    a. Library functions and missions
    b. Operations and operating efficiency
    c. Measurement and statistics
    d. Cost effectiveness
    e. Predictions and projections
4. Continuing research in information transfer
    a. Requirements of small colleges
    b. Opportunities in small colleges
    c. Role of government

C. Opportunities and Problems in New Technologies

1. Man-machine relationships
    a. The practical problems of adoption
        (1) Adapting new techniques to old methods
        (2) Seeking and exploiting new opportunities
        (3) Hardware deficiencies
    b. The psychological problems of assimilation
        (1) Human resistance to change
        (2) Danger of "over-sell"
2. Non-book (audio-visual) media
    a. Sound or audio transfer
    b. Visual transfer
    c. Radio and television
    d. Trends and opportunities
3. Reprography
    a. The copyright problem
    b. On-demand reproduction
    c. Facsimile transfer
    d. Trends and opportunities
4. Miniaturization
    a. Minitext
    b. Microform
        (1) Roll microfilm
        (2) Microfiche
        (3) Aperture card
        (4) Microcard
        (5) Other
    c. Ultra-microform
    d. Miniaturization and reprography
    e. Trends and opportunities
5. Automation
    a. Current role of the computer in information transfer
        (1) In administrative operations
        (2) Conceptual innovations
    b. Trends and opportunities
    c. Problems and deterrents
    d. Alternative facilities possibilities
        (1) Small on-campus computers
        (2) Shared time service
        (3) Separate facilities for information transfer (including library)
6. Cooperative research with industry
    a. Transferability of non-college experience
    b. Mutuality of interest in new developments
    c. Opportunities and problems

D. Interrelationship of Education, Information, and Library Service

1. Theoretical premises
    a. The nature of education
    b. The nature of information
    c. Motivation to obtain information

2. Image and self-image of the librarian
   a. The librarian as a scholar
   b. The librarian as a service administrator
   c. Librarian service initiative
3. Role of information systems in the educational process
   a. Relationship of library to other information resources
      (1) Similarities in missions and services
      (2) Differences in missions and services
      (3) Coordination of resources and services
   b. Use of collections for learning
      (1) Fostering independent study and research
      (2) Encouraging individual progress
   c. Use of collections for teaching
      (1) Provision of facilities
      (2) Guidance and assistance to teaching faculty
   d. Orientation courses
      (1) Need or purpose
      (2) Problems and deterrents
      (3) Evaluation of successful examples
      (4) Developing imaginative alternatives
4. Learning centers and their problems
   a. Kinds of learning centers
   b. Subject materials in non-book media
      (1) Quantity and quality
      (2) External sources
         (a) Availability
         (b) Acquisition
      (3) Local preparation
      (4) Acquisition procedures
   c. Danger of inhibiting independent study
   d. Applicability of programmed instruction
      (1) History and trends
      (2) Opportunities and limitations
   e. Study habits and facilities
      (1) Human engineering research
      (2) Centralized study facilities
      (3) Optional study facilities
      (4) Systems analysis
5. The Library-College movement
   a. Origins and nature of concept
   b. Ideals and practicality
   c. The reference staff alternative

E. Coordination of Administration with User-Oriented Service

1. The concept of user-oriented service
   a. Library missions and priorities
   b. Attitudes of library staff and library clients
2. Evaluation of administration and service efficiency
   a. Procedures
   b. User surveys
      (1) Objectives
      (2) Feasibility and applications

3. Employment of part-time student help
    a. Advantages and disadvantages
    b. Cost-effectiveness
4. Centralized and/or packaged processing
    a. Application of systems analysis
        (1) Cooperative possibilities
        (2) Commercial possibilities
    b. Implications of the MARC project
5. Budgets and operations
    a. Effect of budget on services
    b. Operational policy and procedure guidelines
        (1) The budget bind
        (2) Reassessment of need
    c. The budget and acquisitions
        (1) Procedures for selecting materials
        (2) Formula for allocating funds

F. Information Storage and Retrieval Possibilities

1. History and trends
    a. Traditional library approaches to information retrieval
    b. The "information explosion" and the communications problem
2. Requirements and goals
    a. Book and document retrieval
    b. Selective dissemination of information
    c. Direct access to information content of books
    d. Other?
3. Possible research and development
    a. Information transfer research center
    b. Cooperative research with industry
    c. Other pilot projects

G. Specifics of Establishing a New College Library

1. Operational philosophy
    a. Conceptual alternatives
        (1) Traditional library
        (2) Extended library
        (3) Learning center approach
        (4) Library-college approach
    b. Technological orientation
    c. Relationships with other institutions
2. Organizational relationships
    a. With the administration
    b. With the faculty
        (1) Status of professional library staff
        (2) Role of library reference staff *vis a vis* teaching faculty
        (3) Operational relationships
    c. With instructional services
    d. With computer facilities

3. Practical planning considerations
    a. Size of library holdings
        (1) Books and periodicals
        (2) Microforms
        (3) Paintings and art reproductions
        (4) Art slides
        (5) Recordings
        (6) Other media
    b. Facilities and equipment
        (1) Carrels (electronically equipped and plain)
        (2) Other study facilities
        (3) Typing rooms, reading rooms, listening rooms, etc.
        (4) Dial-access for audio-visual media
        (5) Reprography facilities
        (6) Automated or semi-automated shelving procedures and book retrieval
        (7) Other
    c. Construction plans
        (1) Decisions on G-1 through G-3-b, above
        (2) Fund availability
        (3) College master plan
        (4) Size of campus, number of students, etc.
        (5) Size of library staff
        (6) Other
    d. Others

## VI. RECOMMENDATIONS

It is recommended that:

1. The Office of Education approve the early implementation of a research program along the lines of that presented in outline in the above Conclusions; and,

2. In the absence of an existing mechanism suitable to implement the recommended program (including control, coordination, supervision, and evaluation), the Office of Education should at an early date sponsor an intensive one-week workshop of approximately ten qualified scholars to prepare detailed recommendations for appropriate machinery to implement the program.

# Appendix A

## TERMS OF REFERENCE
(Extract from proposal approved by U.S. Office of Education)

### A. Problem and Objectives

#### Objective

To ascertain the extent to which a research program can be formulated to develop from inception a completely modern library for a new, four-year liberal arts college, to the end that a practical laboratory and demonstration model library could be created, utilizing and implementing the proven new library and information storage, retrieval, and transfer techniques that have been evolved in recent years, in order to facilitate library development for new colleges, or library redevelopment for existing colleges.

#### Rationale of Study: Conceptual Considerations

The Library Requirement. Despite many studies which reveal that the proliferation of books and documents is continuing at a pace which i virtually uncontrollable by conventional library techniques and technology, despite the results of other studies which have demonstrated that ne technology and techniques can cope with the problem, and despite the ALA exhibit of a "Library of the Future" at the Seattle World's Fair in 1963 there have been relatively few efforts to use or to test pragmatically many of the new techniques which have been sponsored or whose developmen has been supported by the Council on Library Resources, the National Science Foundation, and similar granting and supporting institutions.

The possibilities for future library development, and the opportunities for more closely integrating modern library service with the education process, are tantalizingly suggested in two publications which indicate that it is currently feasible to plan and to develop a more effective modern college library:

American Library Association, The Library and Information Networks of the Future, Griffiss Air Force Base, New York: April 8, 1963 (Contract report for the U.S. Air Force).

Laurence B. Heilprin, et.al. (of the American Documentation Institute), Proceedings of a Symposium on Education for Information Science, Washington: 1965.

Particularly relevant in the latter of these two volumes is an essay by Warren F. Seibert, "Human Intellect and the Development of Library Systems," which is abstracted as follows:

> Two recent studies are briefly summarized. One has traced the growth of 58 research libraries in the years since 1950. It shows that these libraries acquired an average of approximately 35,000volumes in 1950-51, that this doubled by 1963-64, and that it may exceed 200,000

volumes by 1979-80. The collections of the libraries averaged 890,000 in 1950-51, grew to 1.49 million volumes by 1964, and may average more than three million volumes in 1980. Expenditures of the libraries averaged less than one-half million dollars in 1950-51, reached $1.5 million in 1964, and seem likely to average $5.4 million in 1980.

The second of the summarized studies analyzed numerous characteristics of instructional message segments (drawn from a linear instructional program in spelling) and used quantifications of these characteristics which could serve to predict each of four indexes of instructional effect. Shrunken multiple correlations ranging from .74 to .80 were obtained. These results and similar, earlier results suggest that effects of instructional messages can be effectively predicted and eventually well controlled.

It is suggested that information storage and retrieval systems should be planned to accommodate library collections of the size anticipated within the next few years and that the training of information scientists may usefully apply the developing techniques of educational technology.

Education and Information Technology Requirement. At present practically all of the higher educational effort in the information sciences is concentrated at the graduate level. It is believed, however, that with the rapid spread of data-processing machinery and technology into all fields of human activity, any college graduate should be familiar with basic punched card systems, copying systems, indexing systems, and other available data and informational tools. Furthermore, to enable students to make the maximum utilization of the projected modern library, they should have a course of instruction in these various systems, and particularly those which are available or planned for the college library. Finally, it seems reasonable to assume that much of the most significant future research in information theory will be undertaken by those who have had real experience and considerable exposure to existing technology, and who are thereby familiar with both the capabilities and limitations of such technology.

Obviously such systems instruction will be mostly technical in nature, and it might reasonably be questioned whether such technical instruction is suitable for college-level instruction. While this is a question which must be investigated further in the research suggested in this proposal, nevertheless two observations appear relevant. First, teaching of currently available information systems technology and techniques will have a purpose analogous to basic instruction in languages, in expository writing, and in science laboratory techniques which are regularly offered in undergraduate college curriculums. Furthermore, the instruction in these systems will be designed to acquaint the student with the systems concepts as much as with specific techniques and technology, since these latter are constantly changing.

## Concept for Developing a Research Program

The Historical Evaluation and Research Organization (HERO) proposes to develop a comprehensive research program which would take into consideration the conceptual considerations discussed above, and which would formulate them into a related series of research studies, all focused toward the establishment of an optimum library for modern liberal arts colleges. In this process of research program development, HERO will bring together three scholars: one with experience in college teaching, accustomed to the use of typical college library facilities for himself and for his students; a modern library specialist; an information systems specialist. These three scholars would review relevant documentary material, would review the status of studies and research sponsored in the recent past by the American Library Association, the Council on Library Resources, and the Inter-University Communications Council (EDUCOM), and others, with a view to defining basic problems in library development and ascertaining what is available in current theory and practical techniques and existing hardware that can be applied to assure the development of the most modern and forward-looking library which is possible.

Particular attention will be given to explorations which have been recently begun by new colleges in the process of development. The results of a recent conference conducted at Amherst, looking toward the development of a new library for Hampshire College, will be of particular importance in this respect. (HERO has already been informally informed by Dr. Franklin Patterson, President of Hampshire College, that all possible cooperation will be given in this project.)

Among other relevant new developments in the field of library, information service, and learning centers which will be explored are the following: the Learning Center at Oklahoma Christian College; the automated and semi-automated systems recently installed at Oakland Community College, in Farmington, Michigan; the instructional procedures and techniques pioneered by Professor Samuel N. Postlethwaite at Purdue University in the Department of Botany; the shared-time system in use of computers now in progress at Dartmouth College; the Learning Center established at Stephens College, Columbia, Missouri; the new techniques and technology being explored at Oral Roberts University, Tulsa, Oklahoma; the experimental library system now in operation at Florida Atlantic University; the library system being employed at Florida Presbyterian College; the library reorganization programs now in process at Harvard University, Dickinson College, and Franklin and Marshall College.

As a result of exploration of documentary materials on the "state of the art," relating to such explorations as "the library-centered college," as well as by observation of actual experimental or operational programs at various colleges and universities throughout the country, the research team for this project will develop over a period of three calendar months a research program which will outline areas of research, and specific suggested research projects in the four following areas:

Systems design--to include: the internal library system; interrelationship between conventional, transitional, and experimental subsystems; and external relationship with networks such as that of EDUCOM. The likelihood that networks of technical information centers have relevance will be explored.

Technology and techniques--to include: such matters as recording and storage; machine searching; analysis and evaluation techniques; and technological developments in teletype, facsimile transmission, cathode ray display, light pencil, optical scanning, photo composition, and the like.

Coordination of administrative and operational procedures--to include: document acquisition, cataloguing, and the like. Standard practices, as well as new developments, will be explored and compared.

Education, information, and library service--to include: the relationship of information science and technology to overall curriculum development, and the elaboration of an instructional program for service center utilization. Questions such as optimum size, decentralization, and location with respect to other college facilities, will be investigated.

## B. Detailed Work Plan

As soon as a contract is awarded, the principal investigator and the project coordinator will prepare preliminary draft statements of objectives, concepts, topical outlines, and suggested procedures for the four or more separate research study plans which are now visualized as comprising the general research program which this study is expected to produce. These preliminary drafts will be circulated to the other two principal participants for study and review, in preparation for a one-day planning conference to be held as soon as possible thereafter.

At the planning conference the preliminary draft statements will be revised and expanded to the maximum extent possible at this early stage in the project. A consolidated list of questions, and of areas for specific exploration, will be prepared, related to the principal headings within each of the separate research plans, in order to be able to complete the research plans. Specific tasks for exploration of existing literature relevant to the overall project will be assigned to each principal participant. In general, these tasks are expected to be in the following categories:

Principal investigator: Plans for conferring with scholars or specialists engaged in relevant exploratory or innovative work at educational institutions, and for observing the results of this ongoing work.

Project Coordinator: Modification and expansion of preliminary drafts; necessary correspondence.

Information Systems Specialist: Review of relevant literature, exploration of current and projected techniques.

Library Specialist(s): Review of relevant literature, exploration of current and projected techniques.

The principal investigator will immediately send copies of the revised drafts and the list of questions and areas for exploration, as produced by the planning conference, to interested scholars or institutional administrators (see list in Appendix A) with a view to arranging a schedule of visits to confer regarding ongoing relevant activities, and to observe these activities, or their results. As soon as possible thereafter, he will undertake these visits, keeping a complete record of the results of all conferneces and observations. Upon his return to Washington, he will prepare a complete report of his visits, circulating this to the other principal participants, and to all of the scholars or specialists whose names or work is referred to in the report. Comments will be invited.

As soon as possible after comments have been received (about ten weeks after the initiation of the project), the four principal participants will meet again in a one-day confernece to discuss preparation of a final study report, which will include the proposed research program, and its detailed, component research plans. A first draft of this report will be prepared by the project coordinator and circulated to all participants before the conference. Following this conference, the project coordinator will prepare a revised draft, on the basis of the results of the conference. This will then be circulated to the other three principal participants, and possibly to other selected scholars, for review and comment. On the basis of the comments received, the principal investigator, assisted by the project coordinator, will prepare and submit a final report to the Bureau of Research, US Office of Education.

## C. Planned Use of Findings

Copies of the final report will be submitted to all individuals who were consulted in the course of the study, requesting their comments as to the utility of the suggested research program. In particular, comments will be invited from the responsible officials of new colleges still in their formative stage, as to the value of this study report to them, and the possibility that they might also benefit from further research along the lines suggested in the research program recommended in the report.

If, as is anticipated, these comments suggest the need for continuing along the lines of research indicated in the study report, then appropriate action will be initiated to obtain the required support to carry out one or more of the research studies recommended in the study report.

Appendix B

## Postulated Context
## for a

## STUDY TO DEVELOP A RESEARCH PROGRAM FOR THE DESIGN DEVELOPMENT OF MODERN COLLEGE LIBRARIES

### The Nature of the College

The college for which the modern college library design is intended is visualized as a small institution; it probably will have no fewer than 1000 students, certainly no more than 2000. It will be a four-year, residential, coeducational, secular, nondiscriminatory institution.

The college will offer a liberal education (or liberal arts) curriculum. In essence, this curriculum will give approximately equal weight to the arts and humanities, the social sciences, and the physical sciences.

The philosophy of the college will be forward-looking and innovational, along lines such as those envisaged for Hampshire College in its "Working Paper No. 1", Franklin Patterson and R. Longsworth, The Making of a College, (MIT Press, Cambridge, 1966), and for the prospective new Herndon College (name tentative) in the Washington area, as expressed in "Academic Considerations in Starting a New College", (HERO, Washington, 1967).

It is expected that, within the limits of its financial resources, the college will make the maximum use of modern conceptual and technological developments for education, such as: individual (or shared) audio-visual study facilities for students; some form of programmed instruction in those subjects to which it is adaptable, to facilitate individual study and individual rates of progress; shared time computers for mathematics and the physical sciences; instruction in modern information processing concepts and techniques; etc.

### The Nature of the Library

#### General

It is assumed that the college library will provide not only traditional library facilities and services, but also whatever is available on the campus in the form of an information resources center, to include any or all learning or teaching centers that are not integral to the facilities of a given department.

(It is possible that one question to be considered in the research program is the extent to which there should be decentralization to departments -- as language learning centers -- as opposed to centralization of all learning resources centers under the control and/or supervision of the library.)

Much of the philosophy now to be found in the "Library-College Movement" will be reflected in the relationship of the library to the college. The library will be centrally located in order that it may, physically as well as intellectually, be a focus for the academic life of the college. (One question that will certainly have to be considered in the research program is the question of possible decentralization of the library to serve "clusters" of 400 to 500 students.)

## The Library and Books

There will be no thought in this library that computers and automation have displaced, or will soon displace, the book. Books are expected to be as important to education and to the library as they ever have been.

It is possible, however, that new means of electronic communication, and of transmission, may eventually give libraries direct or indirect access to books in other libraries, thus permitting the possible pooling of resources, or of specialization. Also, it may prove desirable in many instances to substitute one of the many manifestations of microform for books. While these possibilities will not eliminate books from the college library, they may permit the library to get along without some books which it might not otherwise be able to dispense with. Within the limits of financial resources, it can be expected that the college librarian will strive to obtain any equipment, and to participate in any joint endeavors, which will permit such flexibility.

Professors will be encouraged to use paperback books for their courses, and to require students to purchase such books, to reduce or eliminate the requirement for placing texts on reserved shelves in the library.

## Kinds of Holdings

The college library will not need the depth or variety in its holdings that are essential for universities with their graduate programs. Furthermore, hopefully, the kinds of electronic networks mentioned above will be particularly useful in obtaining access to materials that would only rarely be used in undergraduate research.

One important guide to the holdings of the college will be a list which is currently being prepared by the American Library Association, which reflects considerable work by the University of California in the extablishment of libraries for its new campuses. (This list will be obtained as soon as it is ready.)

## The Library and Technology

It can be expected that the library will, to the extent computer time is available, use computers for adminstrative purposes along lines already extensively pioneered and adopted in a number of large libraries. This includes such things as cataloguing, ordering books and periodicals, and the like.

As suggested above, the library will include one or more learning or teaching centers, whereby students will be encouraged to use a wide variety of stored audio-visual materials to facilitate individual study, and to progress at individual rates of capabilities. This will require the closest kind of coordination and collaboration between the various professors and the library-learning-center staff.

To the extent economically feasible, and academically justifiable in terms of the curriculum and the level of studies, the library will make use of modern information processing techniques and stored data resources. (It is expected that the research program will devote effort to the exploration of this area, and particularly to the establishment of criteria -- including economic feasibility and academic justification -- for adopting media and techniques.)

## Appendix C

# IMPACT OF NON-CONVENTIONAL PROCESSES ON CONVENTIONAL LIBRARY FUNCTIONS AND SERVICES

## Enclosure 1

### Preliminary List of

### NON-CONVENTIONAL PROCESSES
(as, Techniques, Media, Tools, Systems, etc.)

1. Automatic Data Processing (computers)
2. Microform
3. Teaching Center (Learning Resources Center)
4. Audio-Visual Materials
5. Dial Access Systems
6. Programmed Learning (non-computer)
7. Facsimile Transfer
8. On-Demand Reproductions (reprography)
9. TV in Inter-Library and On-Campus Networks
10. Automatic or Semi-Automatic Gadgetry for Routine Functions (charging systems, cameras, label pasters, etc.)

## Enclosure 2

## Sample Process Work Sheet

## APPLICATION OF NON-CONVENTIONAL PROCESSES TO LIBRARY FUNCTIONS AND FACILITIES

## WORK-SHEET

## APPLICATION OF NON-CONVENTIONAL PROCESSES[1] TO LIBRARY FUNCTIONS AND FACILITIES

| CONVENTIONAL FUNCTIONS AND SERVICES | LIBRARY WORLD | | | SMALL COLLEGE LIBRARIES | | | ANALYSIS | |
|---|---|---|---|---|---|---|---|---|
| | Operational[2] | Partly Operational[2] | Planned; Developing; Testing[2] | Operational[2] | Partly Operational[2] | Planned; Developing; Testing[2] | Remarks | Suit. For Future Research[3] |
| Administration (Budget, Personnel, etc.) | | | | | | | | |
| Acquisitions | | | | | | | | |
| Processing (Books, etc.) | | | | | | | | |
| Circulation, Desk Service | | | | | | | | |
| Circulation, Reserve Shelves | | | | | | | | |
| Circulation, Indefinite Loans | | | | | | | | |
| Circulation, Administrative | | | | | | | | |
| Cataloguing | | | | | | | | |
| Reference, Desk Service | | | | | | | | |
| Reference, Records | | | | | | | | |
| Reference, Document Retrieval | | | | | | | | |
| Reference, Data Retrieval | | | | | | | | |
| Reference, Translating Service | | | | | | | | |
| Library Orientation | | | | | | | | |
| Interlibrary Loan Service | | | | | | | | |
| Reproduction | | | | | | | | |
| Displays & Exhibits | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Announcements | | | | | | | | |
| Selective Dissemination of Info. | | | | | | | | |
| Community Service, Adult Education | | | | | | | | |
| Community Service, Book Reviews | | | | | | | | |
| Community Service, Bookmobile | | | | | | | | |
| Community Service, Special Orders | | | | | | | | |
| Community Service, Other | | | | | | | | |
| Storage, Books | | | | | | | | |
| Storage, Periodicals | | | | | | | | |
| Storage, Depository (US, State, Local) | | | | | | | | |
| Storage, Other Materials | | | | | | | | |
| Facilities, Reading Rooms | | | | | | | | |
| Facilities, Special Collections | | | | | | | | |
| Facilities, Carrels | | | | | | | | |
| Facilities, Typing Rooms | | | | | | | | |
| Facilities, Microform Readers | | | | | | | | |
| Facilities, Other | | | | | | | | |
| Other Functions (Incl. "Processes") | | | | | | | | |

1. Techniques; Media; Tools; Systems; etc.
2. Entries to be descriptive, as: most, many, few, none, insufficient info., or N/A.
3. Yes; No; or Doubtful.

# Appendix D

## INTERVIEW PLANNING

### Enclosure 1

### List of Questions

1. Is there a written history of your library? If so, could a copy be made available to us for use in this project?

2. Is there a written description of the library, its services, and its resources? If so, could a copy of this be made available to us?

3. Can the library budget be made available to us?

4. Do you have a copy of the recent publication: Books for College Libraries, American Library Association, Chicago, 1967? Do you have any comments on this?

5. Did you participate in the Creative Research Services survey on the Use of Data Processing Equipment, sponsored by the American Library Association and the Special Libraries Association? If not, did you receive an invitation to participate? If you did participate, do you have any comments on the survey or its results?

6. Regardless of your own background and academic specialty, would you try to formulate in your own mind what you would like to see, if you were in a small college, in the ideal small college library. (A discussion of this question is expected to provide a useful point of departure for the general discussion in the coming interview; presumably your answer will be in terms of policies, or people, or hardware, or facilities.)

Enclosure 2

## INTERVIEW WORK SHEET

### General Questions

1. Comments on work sheet - entered on sheet

2. Comments on list of processes - entered on sheet

3. Responses to questions sent in advance - entered on sheet

4. In a brief summary statement, what would you like to see in an ideal (but practical) small college library? (Presumably answer should be in terms of policies, or people, or hardware, or facilities.)

Would there be likely to be a different reply from the following:

Librarians?

Faculty?

Administration?

Students?

5. Do you have any outside, non-academic group or committee with any responsibility for library affairs, like the Harvard Visiting Committees?

If so, what is its function?

Is it in writing?

What do you think of the idea of such committees?

Would the chairman of that committee mind being contacted by the Chairman of the Herndon College Library Comm.?

Interview Work Sheet

6. Is adequate use of the library being made by the faculty?

What is the basis for your assessment?

How could it be improved?

Is this a subject for useful research?

7. How is the library governed?

What are the lines of authority and responsibility?

Are you satisfied with this?

If not, how should it be changed?

8. What is the source of your library's funds?

Is there any source other than the normal departmental or activity budget?

9. In budgeting, is it possible to shift funds between expense categories, particularly between hardware, books, and services?

10. How are library purchases and services correlated with the curriculum and with research interests of the faculty?

To what extent are faculty members who select books fully aware of the total range of available literature?

11. Do you have a regular library orientation course for students?

When do you have this?

Does it accomplish its purpose adequately?

What changes would you make, if any?

Interview Work Sheet

12. How should the administration of a new college go about selecting a librarian?

Does the ALA provide adequate service?

What is the most likely source for a good librarian for a new college?

At what stage in college development should the librarian be selected?

How much should he be paid?

## Questions Primarily for Librarians

13. Did you participate in the Creative Research Services Inc., Survey on Use of Data Processing Equipment, sponsored by the ALA and SLA?

Have you seen the results?

What do you think of the results?

14. What do you think of the ALA publication on library statistics?

Are you satisfied with college library statistics in general?

Do we need better or more reliable statistics?

Why?

How could we get them?

15. How much benefit have you gotten from research sponsored by CLR, ALA, NSF (OSIS)?

Do you get reports on this research in regular fashion?

How do you get them?

(con't. on next page)

Interview Work Sheet

15. (con't.)
Does anybody else in the college get them?

As far as you are concerned, has this research been worth the expense?

Is there any way that it could have been more worthwhile to you or to others?

16. Have you used library (or management) consultants at any time to evaluate library procedure, collection, etc.?

What results?

17. Have you ever made a library user survey?

What Kind?

What results?

18. Have you ever made an analysis of library personnel, the use of part-time help, use of temporary student help, personnel turnover, etc.?

Any particular results?

19. Is temporary or part-time student help for the library useful to the administration as a means of student employment?

Do you agree with such a policy?

Can you make really effective use of such help?

On a strictly cost-effectiveness basis, could you operate better with fewer, more highly paid, permanent people?

20. Are you satisfied with existing literature about libraries in general, and higher education libraries in particular?

Is it adequately indexed?

Interview Work Sheet

21. Are you satisfied with the role and status of the library staff at this institution?

Why?

## Questions Relating Primarily to Innovation

22. What do you think of the Library College Movement?

Is it realistic?

Do you think it will have any results?

What results would you like to see?

23. What library procedures are being assisted by automation or other mechanization at present?

24. What new and/or unconventional library services and functions have you been undertaking in the last few years? What has been your experience with them?

| Unconventional Services | Experience |
|---|---|

25. What are your plans for the future with respect to:

Computer use?

Microform?

Audio-visual materials?

Other new processes?

Interview Work Sheet

26. What is being done in your college (and in the region) with respect to regional network development?

What kinds of networks are being developed?

What specific action is being taken either to get started, or to improve or expand the network?

What are the problems which interfere with setting up networks, or with having them operate as desired?

Are these networks user-oriented or librarian oriented? Does this make any difference?

If there is a network, is there any real-time gain (counting the lead-time preparation, and the actual processing time)?

27. What is your attitude toward EDUCOM?

Why?

28. What do you think of learning centers, or teaching resource centers?

Should they be related to the library?

Should they be under, or part of the library?

29. Do you favor the idea of a required introductory course in modern data processing theory and practice, comparable to required courses in English composition or laboratory techniques?

Would you or would you not include library orientation with this?

30. Are carrels fully utilized by students?

If not, why not?

(con't. on next page)

Interview Work Sheet

30. (con't.)
Do you have any comments about the psychological aspects of isolation while studying?

---

Is there need for future human-engineering research on the subject of carrels, particularly in the new learning centers?

---

How do you overcome the normal desire of the average student to study in his room?

---

Should this desire be combatted?

---

31. Should the library have general responsibility for all information services or data processing on the campus?

---

Why?

---

32. Should college computers be integrated with or separated from the library?

---

Why?

---

33. Have you read Computers on Campus?

---

What do you think of it?

---

34. Have you read Computers in Higher Education?

---

What do you think of it?

---

35. What would be your reaction if the Office of Education were to hold a College Library Research Conference to consider what should be done in research for college libraries?

---

Who should participate?

---

To what extent should non-librarians participate?

---

How many people should attend?

---

(con't on next page)

Interview Work Sheet

35. (con't.)
How long should it last?

Where should it be held?

36. How could the questions asked in this interview be improved?

37. In the light of the purposes of this research, are there any other people with whom I should talk?

Of these, which must I see regardless of limitations on funds?

Why?

## Appendix E

## INDIVIDUALS INTERVIEWED AND INSTITUTIONS VISITED

### Individuals Interviewed

Mrs. Patricia Andrews, Librarian, Institute for Defense Analyses
Mr. William Archer, Director, Instructional Services, Florida Atlantic University
Mr. Rodney Armstrong, Librarian, Davis Library, Phillips Exeter Academy
Dr. Joseph Axelrod, Center for Research and Development in Higher Education, University of California at Berkeley
Mr. H. William Axford, Director, Library Services, Florida Atlantic University
Dr. Neal Balanoff, Director, Instructional Services, Stephens College
Mr. John D. Bardwell, Educational Media Specialist, New England Center for Continuing Education
Dr. Harold Borko, System Development Corporation
Mr. B. Barnholdt, Chief of Documentation Division, Danish Technological Library, Technological University, Copenhagen, Denmark
Mr. Lynn D. Bartlett, Director, Instructional Services, Oakland Community College
Mr. Charles David Batty, School of Library and Information Services, University of Maryland
Mr. Joseph Becker, Interuniversity Communications Council (Educom)
Mr. Rexford S. Beckham, Assistant Librarian, Automated Systems, University of California at Santa Cruz
Mr. Donald V. Black, System Development Corporation
M. Bleton, Direction des Bibliotheques, Paris, France
Dr. Robert Booth, Chairman, Department of Library Science, Wayne State University
Mr. Peter Brown, Keeper of Catalogues, Bodleian Library, Oxford University
Mr. Douglas W. Bryant, University Librarian, Harvard University
Mr. Lawrence Buckland, Inforonics, Inc., Cambridge, Massachusetts
Miss Wanda J. Calhoun, Librarian, Florida Presbyterian College
Mr. Forrest F. Carhart, Jr., Director, Office of Research and Development, American Library Association
Mr. Thomas Carlin, Assistant Director, Instructional Services, University of California at Santa Cruz
Mr. Donald T. Clark, Librarian, University of California at Santa Cruz
Mr. D.A. Clarke, Librarian, British Library of Political and Economic Science, London School of Economic and Political Science, London, England
Mrs. Evelyn Clement, Learning Resources Librarian, Oral Roberts Univ.

Dr. H. Coblans, Director, ASLIB, London, England
Dr. Joseph Coffey, Political Science Department,
University of Pittsburgh
Mr. C.A. Compton, Science Department, Phillips Exeter Academy
Mr. Dana Cotton, Secretary of the School of Education,
Harvard University
Mr. Donald Culbertson, Executive Secretary, Information Science
and Automation Division, American Library Association
Professor Jon Culbertson, Chairman, Faculty Library Committee,
New College
Dr. Jay E. Daily, Associate Professor of Library Science,
University of Pittsburgh
Dr. J.M. Darlington, Associate Dean, Franklin and Marshall College
Mr. Richard Day, Principal, Phillips Exeter Academy
Mr. Edwin W. Dean, Coordinator, Educational Systems,
National Cash Register Company
Mr. Richard De Gennaro, Associate Librarian for Systems Development,
Harvard University
Mr. J.M. DeJarnatt, Assistant Librarian, New College
Mr. William Duffels, Director of Research, Library,
Technical University of Delft, Holland
Mr. R. Ernest Dupuy, II, Sales Manager, Data Computation Group,
New York Telephone Company
Dr. G.C. Eichholz, Director, Educational Resources,
University of South Florida
Mr. Yates Forbis, Deputy Librarian, Dickinson College
Mrs. Clarice French, Librarian, Oklahoma Christian College
Capt. C.T. Froscher, USN, U.S. Office of Naval Research, London, Englan
Mr. Wilson Garey, McGraw-Hill Book Company
Mr. James L. Glanville, Assistant Marketing Manager,
Industrial Products Division, National Cash Register Company
Mr. W. Guttsmann, Librarian
University of East Anglia, Norwich, England
Mr. Elliot Hardway, Vice-President, (Former Director of Library)
University of South Florida
Mrs. Mary Lou Harkness, Acting Director of Library,
University of South Florida
Mr. Robert J. Havlick, Librarian, Nova University
Dr. Robert M. Hayes, Director, Institute of Library Research,
University of California at Los Angeles
Dr. Laurence B. Heilprin, School of Library and Information Services,
University of Maryland
Mr. Earl A. Helgeson, Jr., Assistant to the President, New College
Mr. Gerald Hubble, Director of Library, Stephens College
Brig. Gen. Henry Huglin, USAF, Ret., G.E. Tempo
Dr. W.W. Jernigan, Director, Learning Resources and Libraries,
Oral Roberts University
Mr. Robert T. Jordan, Council on Library Resources
Professor John G. Kemeny, Chairman, Department of Mathematics,
Dartmouth College
Mr. Allen Kent, Director, Knowledge Availability Systems Center,
University of Pittsburgh

Dr. Jerry Kidd, School of Library and Information Science,
University of Maryland
Mr. John Knapp, Information Systems Office, Library of Congress
Dr. Patricia Knapp, Professor, Department of Library Science,
Wayne State University
Professor Thomas Kurtz, Director Kiewit Computation Center,
Dartmouth College
Madame La Coin, Assistant Director, Library,
Institute of Political Science, University of Paris
Mr. David Lane, Project Director, Science Acquisitions Study,
American Library Association
Miss J.E.I. Larter, Librarian, Scientific Periodicals Library,
Cambridge University, England
Mrs. Ruth A. Little, Librarian, Santa Barbara City College
Mr. Gerard B. McCabe, Assistant Director of Libraries,
University of South Florida
Mr. Glenn McMurry, Director, National Information Center for
Educational Media, University of Southern California
Dr. Samuel H. Magill, Dean of the College, Dickinson College
Mrs. Barbara Evans Markuson, Graduate Library School,
University of Chicago
Mr. Jules Mersel, System Development Corporation
Mr. Thomas Minder, Executive Director,
Pittsburgh Regional Library Center
Mr. John H. Moriarty, Director, University Library, Purdue University
Professor Louis Morton, History Department, Dartmouth College
Miss Judy Murray, Assistant Librarian, Auburn Campus,
Oakland Community College
Mr. Richard Nelson-Jones, Acting Director,
New England Board of Higher Education
Dr. David Nolan, Director, Educational Testing Service, Washington, D.C.
Dean R. Stafford North, Dean of Instruction,
Oklahoma Christian College
Dr. Ralph H. Parker, Librarian, University of Missouri
Dr. Franklin Patterson, President, Hampshire College
Mr. William A. Pease, Librarian, Franklin and Marshall College
Mr. Brian Perry, Office of Scientific and Technical Information,
Ministry of Education and Science, London, England
Mr. Paul A. Perry, Assistant Dean, School of Education,
Harvard University
M. Paul Poindron, Inspecteur General des Bibliotheques de France,
Direction des Bibliotheques, Paris, France
Professor Samuel N. Postlethwait, Professor of Botany,
Purdue University
Dr. Wesley Posvar, Chancellor, University of Pittsburgh
Mr. Donald R. Quayle, Executive Director, Eastern Education Network
Dr. James G. Rice, Academic Vice President, Stephens College
Mr. D.T. Richnell, Goldsmiths' Librarian, University of London, England
Mr. Thomas Risner, Assistant Director, National Information Center
for Educational Media, University of Southern California
Dr. Vernon Ritter, Librarian, Westmont College
Dr. Theodore Ropp, Professor of History, Duke University
Mr. Marvin J. Rosen, Director, Instructional Services,
University of California at Santa Cruz

Mr. Melville J. Ruggles, Executive Director,
National Advisory Commission on Libraries
Dr. James E. Russell, Educational Policy Commission,
National Education Association
Mr. Harold Schell, Assistant Director, Public Service - Library,
University of Pittsburgh
Mr. P. Schuller, Director, Armed Forces Technical Documentation
and Information Center, The Hague, Netherlands
Mr. Lewis Schultheiss, Acting Director, Libraries,
University of Illinois at Chicago
Mr. Stephen Sicard, Media Information Specialist
Mr. Harry F. Silberman, Head, Education and Training Staff,
Technology Directorate, System Development Corporation
Dr. H.W. Sinaiko, U.S. Office of Naval Research, London, England
Dr. Charles W. Slack, Westinghouse Learning Corporation
Dr. Robert Snider, Division of Audio-Visual Instructional Service,
National Education Association
Mr. Jack P. Solovy, President, CORCO, Inc.
Mr. Helge Stenkilde, Inspector of Public Libraries,
Copenhagen, Denmark
Dr. C. Walter Stone, Director of University Libraries,
University of Pittsburgh
Miss Elizabeth Stow, Union Catalogue Librarian,
Scientific Periodicals Library, Cambridge, University
Capt. Ralph Styles, USN, Ret., Director of Planning, New College
Mr. Thomas Sutton, Audio-Visual Department, Oakland Community Colllege
Mrs. Tansey, Assistant Librarian, University of California, Santa Cruz
Mr. Robert S. Taylor, Director of the Library, Hampshire College
Dr. Arthur D. Trottenberg, Assistant Dean, Faculty of Arts and Sciences,
Harvard University
Professor William R. Van Cleave, School of International Relations,
University of Southern California
Mr. Donald E. Vincent, Librarian University of New Hampshire
Madame Wang, Assistant for Cataloguing, Library,
Institute of Political Science, University of Paris
Dr. L. J. van der Wolk, Librarian, Technical University of Delft

## Institutions Visited

### Academic--United States

Dartmouth College
Dickinson College
Florida Atlantic University
Florida Presbyterian College
Franklin and Marshall College
Hampshire College
Harvard University
New College
Nova University
Oakland Community College

Oklahoma Christian College
Oral Roberts University
Phillips Exeter Academy
Purdue University
Santa Barbara City College
Stephens College
University of California at Berkeley
University of California at Los Angeles
University of California at Santa Cruz
University of Illinois at Chicago
University of Maryland
University of Missouri
University of New Hampshire
University of Pittsburgh
University of South Florida
University of Southern California
Wayne State University
Westmont College

## General--United States

American Library Association, Chicago, Illinois
CORCO, Inc., Chicago, Illinois
Council on Library Resources, Washington, D. C.
Division of Audio-Visual Instructional Service,
    National Education Association, Washington, D. C.
Eastern Educational Network, Cambridge, Massachusetts
Educational Policy Commission,
    National Education Association, Washington, D. C.
Educational Systems, National Cash Register Company, Dayton, Ohio
Information Systems Office,
    Library of Congress, Washington, D. C.
Inforonics, Inc., Cambridge, Massachusetts
McGraw-Hill Book Company, New York, New York
National Advisory Commission on Libraries, Washington, D. C.
New England Board of Higher Education, Durham, New Hampshire
New England Center for Continuing Education, Durham, New Hampshire
New York Telephone Company, New York, New York
Pittsburgh Regional Library Center, Pittsburgh, Pennsylvania
System Development Corporation, Santa Monica, California

## Academic--Europe

Cambridge University, England
Danish Technological University, Copenhagen, Denmark
Institute of Political Science, University of Paris, France
London School of Economic and Political Science, England
Oxford University, England
Technical University of Delft, Netherlands
University of East Anglia, Norwich, England
University of London, England

General--Europe

Association of Special Libraries and Information Bureaus,
London, England
Directorate of Libraries of France, Paris, France
Inspectorate of Public Libraries, Copenhagen, Denmark
Netherlands Armed Forces Technical Documentation and Information
Center, The Hague, Netherlands
Office of Scientific and Technical Information,
Ministry of Education and Science, London, England
U. S. Office of Naval Research, London, England

## Appendix F

## A PROPOSED STANDING COMMITTEE ON COLLEGE LIBRARIES AND INFORMATION TRANSFER RESEARCH

The research program suggested in this report could be implemented (to include control, direction, supervision, and evaluation) by a Standing Committee on College Libraries and Information Transfer Research. The Committee would be established by the Commissioner of Education (or other appropriate public or private official) and would be composed of not more than 20 persons, so distributed geographically that each region for which there is a regional accrediting association would be represented by at least one academic member. The membership of the Committee would include at least one individual representing each of the following qualifications or characteristics (in some cases one person could fill two of the positions indicated):

A college librarian (or director or dean of library)
A senior academic research librarian
A professor (or dean) of a library school
A professor (or dean, or director) of information science
Two professors from the physical sciences (different disciplines)
Two professors from the social sciences (one an economist)
A professor from the humanities
A college academic dean or academic vice president
A professor of education
A commercial information systems specialist
A representative of the electronics hardware industry
A representative from non-electronic educational industry
A representative from private, non-industrial research
A representative from the publishing industry
A representative from the Library of Congress
A representative from the Office of Education

The Chairman (appointed by the Commissioner of Education) would be authorized to establish a small permanent staff consisting of no more than three persons, including an Executive Secretary.

The Committee's assigned mission would be to direct, coordinate, and evaluate the long-range research program for college libraries and information systems. It would be required to meet at least twice annually. Otherwise, its procedures would not be prescribed. At its first meeting the Committee would establish its methods of operation, set preliminary goals and objectives, and lay out a program for carrying out its responsibilities, subject to approval by the Commissioner of Education. The first financial requirement for the support of the long-range research program would be the provision of funds for a modest and austere budget for the Committee and its staff.

## Appendix G

## BIBLIOGRAPHY

### Books and Published Pamphlets

Adams, Harlen Martin, *The Junior College Library Program: A Study of Library Services in Relation to Instructional Procedures*, Stanford: American Library Association and Stanford University Press, 1940.

Alouche, F., *et* *al*, *Economie Generale d'une Chaine Documentaire Mechanisee*, Paris: Gauthier-Villars, 1967.

Alt, Franz L., *Information Handling in the National Standard Reference Data System*, Washington: U.S. Dept. of Commerce, 1966.

"Audio Services and Facilities, A Panel Discussion," *Library Environment: Aspects of Interior Planning*, Chicago: American Library Association, 1965, pp. 41-50.

Batteau, Dwight W., *Information Communication and Knowledge*, Cambridge: Windward House, 1966.

Becker, Joseph and Robert M. Hayes, *Information Storage and Retrieval: Tools, Elements, Theories*, New York: John Wiley & Sons, 1963.

Boehm, Eric H. (ed.), *Blueprint for Bibliography*, Santa Barbara: Clio Press.

Bowles, Edmund A. (ed.), *Computers in Humanistic Research*, New York: Prentice Hall, 1967.

British Central Office of Information, Reference Division, *Britain in Brief*, London: HMSO, 1967.

British Department of Education and Science, *The Further Education of the General Student*, London: HMSO, 1967.

______, *Trends in Education*, London: HMSO, No. 2, April 1966; No. 6, April 1967; No. 7, July 1967.

Brown, James W. (ed.), *New Media in Higher Education*, Washington: National Education Association, 1963.

Brumbaugh, A. J., *Establishing New Senior Colleges*, Atlanta: SREB research monograph number 12, 1966.

Buck, Paul, Libraries and Universities, Cambridge: Harvard, Belknap, 1964.

Buckland, L. F., Development of a Computer Processing Center for the New England State University Libraries, Cambridge: Inforonics, Inc., July 13, 1967.

______, Recording of Library of Congress Bibliographical Data in Machine Form, Washington: Council on Library Resources, 1965.

Caffrey, John and Charles J. Mossmann, Computers on Campus, Washington: American Council on Education, 1967.

Coblans, Hubert, Use of Mechanized Methods in Documentation, London: Aslib, 1966.

Cogswell, John F.,(principal investigator), Analysis of Instructional Systems, Palo Alto: System Development Corp., 1966.

Conference Within a Conference, Chicago: American Library Association, 1963.

The Copyright Law as it Relates to National Information Systems and National Programs, Washington: Committee on Scientific and Technical Information, Federal Council for Science and Technology, 1967.

Council of Social Science Data Archives, Social Science Data Archives in the United States--1967, New York: 1967.

Cox, Nigel S.M., The Computer and the Library; the Role of the Computer in the Organization and Handling of Information in Libraries, Hamden, Conn.: Archon Books, 1967.

Danish Government, Bibliotekstilsynet, The Danish Public Libraries Act, 1964, Copenhagen: 1965.

Dartmouth Computing Project: John G. Kemeny, Dir.; Thomas E. Kurtz, Assoc. Dir.; Teaching Supplement No. 1: Use of the Computer in a Course in Number Theory; Teaching Supplement No. 2: Computer Programs of Use in Elementary Statistics; Teaching Supplement No. 3: Computer Programs of Use in Elementary Statistics; Teaching Supplement No. 4: Use of the Computer in a Course in Logic; Teaching Supplement No. 5: Using the Computer in the Teaching of Constructive Linear Algebra; Final Report: The Dartmouth Time-Sharing Computing System, June 1967.

Educational Facilities Laboratories, High Schools 1962, New York: 1962.

______, Bricks and Mortarboard; A Report on College Planning and Building, New York: 1966.

Euratom, Le Syntol (Syntogmatic Organization Language; Study of a General System of Automatic Documentation), Brussels: 1963.

*Euratom-Thesaurus*, Brussels: 1964.

*Evaluation of Chemistry Library*, Pittsburgh: University of Pittsburgh, October 1967.

*Final Report of the Joint Committee on the Organization of the Congress*, Washington: U.S. Congress, 1966.

Fry (George) and Associates, Inc., *Study of Circulation Control Systems: Public Libraries, College and University Libraries, Special Libraries*, Chicago: Library Technology Project of the American Library Association, 1961.

Gerard, R.W. (ed.), *Computers and Education*, San Francisco: McGraw-Hill, 1967.

Gifford, Don C., *Toward New Patterns: A Liberal Arts College*, Williamstown, Mass.: Williams College, 1960.

Goodlad, John I., *et al*, *Computers and Information Systems in Education*, Burlingame: Harcourt, Brace & World, Inc., 1966.

Harrison, John, and Peter Laslett, *The Brasenose Conference on the Automation of Libraries*, London: Mansell, 1967.

Harvey, John (ed.), *Drexel Conference on Data Processing in University Libraries; Data Processing in Public and University Libraries*, Washington: Spartan Books, 1966.

Havlick, Robert J., *et al*, *Special Libraries Problems and Cooperative Potentials*, Washington: American Documentation Inst., 1967.

Hays, David G., *et al*, *A Billion Books for Education in America and the World: A Proposal*, Santa Monica: The Rand Corp., 1967.

Heilprin, Laurence B., *et al*, (eds.), *Proceedings of the Symposium on Education for Information Science*, Washington: Spartan Books, 1965.

Hovey, Thomas E., *Randtriever Storage System for Books*, Herkimer: Remington Office Systems Div., Sperry Rand Corp., Library Bureau, June 15, 1967.

*Introductory Guide*, London: University of London Library, August 1967.

Kemeny, John G., and Thomas E. Kurtz, *BASIC - A Manual for BASIC, the Elementary Algebraic Language Designed for Use with the Dartmouth Time-Sharing System*, Dartmouth College, 1 January 1966.

Kent, Allen (ed.), *Library Planning for Automation*, Washington: Spartan Books, 1965.

King, Gilbert W., *et al*, *Automation and the Library of Congress*, Washington: Library of Congress, 1963.

Klein, H.M.J., History of Franklin and Marshall College, 1787-1948, Lancaster: 1952.

Lewis, Robert, and Joseph Fedor, Accounting for Installment Sales--Subject-Matter Specifications--Oakland Community College, Anaheim, California: Litton Instructional Materials, Inc.

Leyden, Ralph C., and Neal Balanoff (eds.), The Planning of Educational Media for a New Learning Center, Columbia, Missouri: Stephens College, 1963.

Leyden, Ralph C., 10 Years of Closed Circuit TV at Stephens College, 1955-1965, Stephens College Educational Report IV, Columbia, Missouri: Stephens College.

Library Administration Division, Library Statistics of Colleges and Universities, 1965-1966, Institutional Data, Chicago: American Library Association, 1967.

Library Guide 1967; So You're Thinking of Coming to Santa Cruz; The Undergraduate College, Santa Cruz: University of California, 1967.

The Library and Information Networks of the Future, Griffiss AF Base, New York: American Library Association, 1963.

The Library Research Institute of the University of California, A Report on a Study Made by Robert M. Hayes, 8 April 1964.

Library Statistics: A Handbook of Concepts, Definitions, and Terminology, Chicago: American Library Association, 1966.

Licklider, J.C.R., Libraries of the Future, Cambridge: MIT Press, 1965.

Litton Industries, Quikomp IX Program System, Orange: Monroe International, Inc., 1965.

Lyle, Guy Redvers, et al, The Administration of the College Library, 3rd ed., New York: Wilson, 1961.

Marke, Julius J., Copyright and Intellectual Property, New York: Fund for the Advancement of Education, 1967.

Markuson, Barbara Evans (ed.), Libraries and Automation, Washington: Library of Congress, 1964.

Mellott, C., Outline for a Preliminary Study of the Use of Transformational Grammar to Select Index Terms of Technical Reports from Their Titles and Abstracts, Pittsburgh: University of Pittsburgh, October 1967.

Mesthene Emanuel C., Program on Technology and Society; Second Annual Report, Cambridge: Harvard University, 1966.

______, An Experiment in Understanding, Cambridge: Harvard University, 1966.

Metcalf, Keys D., Planning Academic and Research Library Buildings, New York: McGraw-Hill, 1965.

Minder, Thomas, The Pittsburgh Regional Library Center. The Center in the Mid 1970's. A Concept Paper, July 1967.

Murphy, Judith, and Ronald Gross, Learning by Television, New York: The Fund for the Advancement of Education, 1966.

National Cash Register Company, A New Publication Method--The PCMI Microform System.

National Research Council, Communication Systems and Resources in the Behavioral Sciences, Washington: The National Academy of Sciences, 1967.

National Science Foundation, Nonconventional Scientific and Technical Information Systems in Current Use. No. 4. Washington: U.S. Government Printing Office, 1966.

Oral Roberts University, "Learning Resources Center is Built Around Instruction," Why ORU is Your Business, Tulsa: 1967.

Overhage, Carl F.J., and Joyce R. Harman (eds.), Intrex; Report of a Planning Conference on Information Transfer Experiments, Cambridge: MIT Press, 1965.

Park Forest College, Where Else Such Promise? Park Forest, Illinois: 1962.

Patterson, Franklin, and Charles R. Longsworth, The Making of a College, Cambridge: MIT Press, 1966.

Pierce, James R., et al, Computers in Higher Education, A Report of the President's Science Advisory Committee, The White House, February 1967.

Popham, James W., Educational Criterion Measures, Inglewood: Southwest Regional Laboratory for Educational Research and Development, 1967.

Postlethwait, Samuel N., et al, Plant Science: A Study Guide with an Audio Tutorial Approach, 2nd ed., Minneapolis: Burgess Publishing Company, 1967.

______, Teaching Tools and Techniques: An Audio-Tutorial Approach to Teaching.

Proceedings of the Annual Meeting, v. 1, American Documentation Institute, 1964.

Public Library Service, Chicago: American Library Association, 1956.

Report on an Experiment in Automatic Documentation and Proposals for its Development, Maison des Sciences de l'Homme, Centre d'Analyse Documentaire pour l'Afrique Noire, Service d'Etudes Sociologiques et Documentaires, Paris: CADAN, 1962.

Rupp, Brigitta, *Inventaire des Registre de la Recherche en Cours dans le Domaine des Sciences Sociales et Humaines en Afrique Noire*, Ecole Pratique des Hautes Etudes, Paris: CADAN, 1966.

Ruskin, Arnold M., *et al*, *A Joint College/Industry Library with Automata*, Washington: Council on Library Resources, 1964.

Santa Barbara City College Library, *Requirements for 4000 F.T.E. Student Body*.

Scherer, Henry H., *Faculty-Librarian Relationships in Selected Liberal Arts College: Doctoral Dissertation*, Los Angeles: University of Southern California School of Education, 1960.

Schramm, Wilbur, *et al*, *Programmed Instruction. Four Case Studies*, New York: Fund for the Advancement of Education, 1964.

Schuller, J.A. (ed), *TDCK - Circular Thesaurus System*, The Hague: Netherlands Armed Forces Scientific and Technical Documentation Center, 1966.

Schultheiss, Louis Avery; Don S. Culbertson; and Edward M. Heileger; *Advanced Data Processing in the University Library*, New York: Scarecrow Press, 1962.

*Scientific Periodicals Library*, Cambridge: University of Cambridge, 1967.

Special Libraries Association, Washington, D.C. Chapter, Documenta-Group, *Initiating a Library Automation Program*, Washington: 1966.

*Standards for School Library Programs*, Chicago: American Association of School Libraries, 1960.

Stevens, Mary E., and John L. Little, *Automatic Typographic-quality Typesetting Techniques; A State-of-the-Art Review*, National Bureau of Standards Monograph 99, Washington: U.S. Government Printing Office, 1967.

Stickler, W. Hugh, *Experimental Colleges*, Tallahassee: Florida State University, 1964.

Stone, C. Walter, *A Library Program for Columbia*, Pittsburgh: 1965.

*Student Use of Libraries: An Inquiry into the Needs of Students, Libraries and the Educational Process*. Chicago: American Library Association, 1964.

Taylor, Robert S., *Curriculum for the Information Sciences*, Report No. 12; Final Report, *Recommended Courses and Curricula*, National Science Foundation Grant, September 1967.

______, *Studies in the Man-System Interface in Libraries*, Report No. 3, Question-Negotiation and Information-Seeking in Libraries, July 1967.

Taylor, Robert S., and Caroline E. Hieber, Library Systems Analysis, Report No. 3, Bethlehem: Lehigh University, 1965.

Technology Transfer and Innovation, Proceedings of a Conference, National Science Foundation, May 1966.

U.S. Office of Education, National Inventory of Library Needs, Chicago: American Library Association, 1965.

______, Library Statistics of Colleges and Universities, 1959/60. Washington: U. S. Office of Education.

University Grants Committee, Report of the Committee on Libraries, London: HMSO, 1967.

Wasserman, Paul, The Librarian and the Machine, Detroit: Gale Research Company, 1965.

Wheeler, Joseph L., and Herbert Goldhor, Practical Administration of Public Libraries, New York: Harper and Row, 1962.

Wood, Elizabeth I., Project History Retrieval, Philadelphia: Drexel Institute of Technology, 1966.

Workshop Conferences to Foster Innovation in Higher Education, Union for Research and Experimentation in Higher Education, Antioch Colle
Conference 1. Dimensions of Changes in Higher Education, May 1966;
Conference 2. New Designs for Liberal Arts Colleges, Dec. 1966;
Conference 3. Innovation in the Teaching of Science, Jan. 1967;
Conference 4. Climates of Learning and the Innovative Process, April 1967.

## Articles in Periodicals

Adkinson, Burton W., and Charles M. Stearns, "Libraries and Machines - A Review," American Documentation, v. 18, no. 3, July 1967, pp. 121-124.

Agard, R. M., "Library in the Undergraduate Colleges," North Central Association Quarterly, Winter, 1962.

Ainscough, P.J., "Automation in Libraries," Assistant Librarian, v. 58, October 1965, pp. 204-205.

Armstrong, Rodney, "The New Library," The Phillips Exeter Bulletin, Summer, 1967.

Astin, Alexander W., "Distribution of Students Among Higher Educational Institutions," Journal of Educational Psychology, v. 55, October 1964, pp. 276-287.

"Automation in Libraries Slow but Sure," Automation, v. 13, April 1966, p. 31.

Axelrod, Joseph, "NDEA Foreign Language Institute Program: The Development of a New Educational Tool," PLMA (Publication of the Modern Language Association of America), v. LXXXII, no. 4.

Bach, Harry, "Why Allocate?" Library Resources, v. 8, Spring 1964, pp. 161-165.

Balanoff, Neal, "Stephens College, The James Madison Wood Quadrangle (Learning Center)," Audiovisual Instruction, February 1965.

Becker, Joseph, "IBM Circulation Control," Drexel Library Quarterly, v. 1, pp. 29-32.

Bergeson, Clarence O., "Relationship of Library Science and Audiovisual Instruction," Audiovisual Instruction, v. 12, no. 2, February 1967, pp. 100-103.

Beswick, Norman W., "The 'Library College'--The 'True University'?", The Library Association Record, June 1967, pp. 198-202.

Bregzis, R., "Ontario New Universities Library Project, An Automated Bibliographic Data Control System," College and Research Libraries, v. 26, November 1965, pp. 495-508.

Bulletin of the Interuniversity Communications Council, Educom, v. 1, no. 7, October 1966; v. 2, no. 1, January 1967; v. 2, no. 3, April 1967.

Burke, J.E., "Automation in the Library: Challenge or Vision?", American Library Association Bulletin, v. 28, Fall 1965, pp. 91-94.

"Campus '65," Newsweek, March 22, 1965, pp. 43-63.

Christianson, E.B., "Automation and Libraries," Special Libraries, v. 57, Fall 1966, pp. 101-102.

"Classless University: Colleges Add Programs for Independent Study to Avoid Academic Rush," Wall Street Journal, April 5, 1955, pp. 1, 12.

"Data Processing Manual," Wilson Library Bulletin, v. 40, February 1966, p. 496.

De Gennaro, Richard, "A Strategy for the Conversion of Research Library Catalog to Machine Readable Form," College and Research Libraries, v. 28, no. 4.

"Development Planned for Computer Center," Franklin and Marshall College Reporter, December 13, 1966.

"Dial-a-book Library in Holland. Technical University of Delft." Times (London) Educational Supplement, November 26, 1965, p. 1166.

"Dial-a-book System Begun in Netherlands University," Library Journal, v. 91, April 15, 1966, p. 2022.

Egan, M.J., "Tiptoe in Technology Suggestions for Coping with the New Media," Library Journal, v. 92, April 15, 1967, pp. 1711-1713.

"Electronic Learning Center: Oklahoma Christian College," Catholic School Journal, v. 66, May 1966, pp. 32-33.

Ennis, Philip H., Ralph Parker, et al, "A Kaleidescopic View of Library Research," Wilson Library Bulletin, special issue, May 1967.

Eurich, Alvin C., "The Commitment to Experiment and Innovate in College Teaching," Educational Record, v. 45, Winter, 1964, pp. 49-55.

Freitag, Wolfgang M., "Planning for Student Interaction with the Library," California Librarian, v. 26, April 1965, pp. 89-96.

Garvey, William D., Bertita E. Compton, et al, "The Information Deluge," The Johns Hopkins Magazine, special issue, Fall 1967.

Gellen, E., "Media Librarian and A/V," Library Journal, v. 92, April 15, 1967, p. 1683.

Gifford, Don C., "Saving the Liberal Arts," Commonweal, v. 80, June 12, 1964, pp. 359-361.

Goldstein, H., (ed.) "Audiovisual Issue," Illinois Librarian, v. 48, February 1966, pp. 69-136.

Griffin, H. L., "Computer Programming for Library Applications," Southeastern Librarian, v. 15, Fall 1965, pp. 130-136.

Gwynn, Stanley E., "The Liberal Arts Function of the University Library," Library Quarterly, v. 24, October 1954, pp. 311-321.

Hammer, Donald P., "Automated Operations in a University Library - A Summary," College and Research Libraries, v. 26, January 1965, pp. 19-29, 44.

Hartnett, Rodney T., and Clifford T. Stewart, "Final Examination Grades of Independent Study Students Compared with Those of Students Taught by Traditional Methods," Journal of Educational Research, v. 59, April 1966, pp. 356-357.

Hayes, Robert M., "The Research Program of the University of California's Institute of Library Research," Library Journal, October 1, 1966.

Heilprin, Laurence B., "Technology and the Future of the Copyright Principle," Phi Delta Kappan, January 1967.

Herbert, Evan, "Technology for Education," International Science and Technology, no. 68, August 1967, pp. 21-49.

Hubbard, R.D., "AV and Library: Complement or Merge," Audiovisual Instruction, v. 11, June 1966, pp. 442-443.

"Illinois Library Computerized," Iowa State Government, Administration, Des Moines, Iowa.

"Individual Study Carrels," Architectural Record, v. 134, October 1963.

James, B., "Gaylord Charging System," Drexel Library Quarterly, v. 1, July 1965, pp. 18-20.

Janecek, B.E., "Chicago U's Laboratory School," Library Journal, December 15, 1965, pp. 5468-5471.

Jolley, L., "The Function of the University Library," Journal of Documentation, v. 18, no. 3, September 1962, pp. 133-142.

Jones, R. C., "Multicampus Instructional Resources Services; Three New Campuses in St. Louis," Junior College Journal, v. 36, March 1966, pp. 11-13.

Josey, E.J., "Enhancing and Strengthening Faculty-Library Relationships," Journal of Negro Education, v. 33, Spring 1964, pp. 191-196.

Kemeny, John G., "The Computer at Dartmouth," Dartmouth Alumni Magazine, Summer 1967.

"Kiewit Computer Center Dedicated," Dartmouth Alumni Magazine, January 1967.

Knapp, Patricia B., "The Monteith Library Project, An Experiment in Library-College Relationship," College and Research Libraries, v. 22, July 1961, pp. 256-263.

______, "Suggested Program of College Instruction in the Use of the Library," Library Quarterly, v. 26, July 1956, pp. 224-231.

"Libraries: How Not to Waste Knowledge," Time, v. 86, September 3, 1965, pp. 52-57.

"Library 21's Electronic Library Previewed in New York," Library Journal, v. 87, April 15, 1962, pp. 1567-1568.

Lyle, Guy R., "Stress and Strain in Academic Librarianship," Library Journal, January 15, 1968.

Madden, Charles F., "Person to Person Teaching," Saturday Review, July 18, 1964.

Miller, James G., "Educom: Interuniversity Communications Council," Science, v. 154, no. 3748, October 28, 1966, pp. 483-488.

Morris, Barry (ed.), "The Function of Media in the Public Schools," Audiovisual Instruction, January 1963.

Morrissey, E.F., "Mechanized Book Order and Accounting Routine," Southeastern Librarian, v. 15, Fall 1965, pp. 143-148.

Mousilite, Peter S., "A Program for the Talented College Student," School and Society, v. 94, March 5, 1966, pp. 125-126.

Oxhandler, Eugene K., "Bringing the 'Dons' Up to Date," Audiovisual Instruction, v. 8, October 1963, pp. 566-569.

Pizer, I.H., "Mechanized Circulation System," College and Research Libraries, v. 27, January 1966, pp. 5-12.

"Push-button Carrels for the World's Fair," American Schools and Universities, v. 36, April 1964, pp. 34-35.

Rothstein, Samuel, "In Search of Ourselves," Library Journal, January 15, 1968.

Salinger, L., "Discovery: A Study in Audio-visual Saturation," Library Journal, v. 92, February 1967, pp. 849-852.

Scherer, Henry Howard, "Of Librarians and Other Aborigines," Wilson Library Bulletin, v. 38, May 1964, p. 781.

Schick, Frank L., John C. Frantz, and Staff, "Library Science Research Needs," Journal of Education for Librarianship, Spring 1963.

Silberman, Charles E., "Technology is Knocking at the Schoolhouse Door," Fortune, August 1966.

Slack, Charles W., "The Politics of Educational Objectives," Educational Technology, July 30, 1967.

"A Statement of Objectives and Methods of Operation," Educom, Pittsburgh, June 1967.

Tirrell, John E., "Total!! Independent Study at Oakland," Junior College Journal, v. 36, April 1966, pp. 21-23.

"Use of Data Processing Equipment in Circulation Control," Library Technical Report, July 1965.

Vincent, Donald E., "New England State University Libraries' Regional Processing Center," ALA Bulletin, June 1967.

Wasserman, Paul, "Development of Administration in Library Service; Current Status and Future Prospects," College and Research Libraries, July 1958.

## Miscellaneous Unpublished Documents

Andrews, Theodore (ed.), "Libraries, Automation in the Library: When, Where, and How. Papers Presented at the Meeting." Purdue University, October 2-3, 1964.

Armitage, Janet E., and Michael F. Lynch, *Articulation in the Generation of Subject Indexes by Computer*, University of Sheffield, England: April 1967. Presented at the 153rd National Meeting of the American Chemical Society, Chem. Lit. Div., Miami, Florida, April 1967.

Axelrod, Joseph, *Model M: A Curriculum Model for a Computer-Based Experimental College on the Large Urban Campus*.

CADAN (Centre d'Analyse Documentaire Pour l'Afrique Noire), *Fiches Analytiques*, Paris, 1964.

Carter, Launor F., *Personalizing Instruction in Mass Education by Innovations in the Teaching-Learning Process*. Paper presented at National Conference on Curricular and Instructional Innovation for Large Colleges and Universities, Michigan State University, East Lansing, Michigan, November 1966.

Dickinson College Library: *Monthly Budget Statement*; *History*; *Special Facilities and Services*; *The Audio Visual Center*; *Program of Facilities*.

Franklin and Marshall College Library: *Library Consultants Report, 1966 Student Questionnaire, 1967*; *Faculty Questionnaire, 1967*; *Student Guide*; *The College Library*; *Annual Budget*.

Hale, Sir Edward, KBE, CB, *Library and Undergraduate*. A paper read toUniversity and Research Section Conference, Reading: April 1965.

Heilprin, Laurence B., *The Economics of "On Demand" Library Copying*, NMA Proceedings 1962, pp. 311-339. Council on Library Resources.

______, *Toward a Definition of Information Science*. Paper presented at meeting of American Documentation Institute, October 1963.

Historical Evaluation and Research Organization, *Academic Considerations in Starting a New College*, Washington, 1967.

Howard, James H., *Electronic Information Display in the Management Information System*, MA Thesis, Washington: The American University, 1965.

*The Impact of Technology on the Library Building*. A position paper prepared for Education Facilities Laboratories, New York.

Izard, Francoise, *An Experiment in Automatic Data Processing for the Bibliography Concerning Africa South of the Sahara*. Paper read at African Studies Association Meeting, Columbia University, October 21, 1961.

Line, Maurice B., Libraries in Institutions of Higher Education; Independence Versus Interdependence. A paper given at the Conference of the University and Research Section of L.A., January 1966.

Minder, Thomas, Address Before the Pittsburgh Council on Higher Education, Mellon Institute, February 16, 1967.

Minder, Thomas, et al, Initiating a Library Automation Program. Papers presented at the 1965-66 meeting, Documentation Group, Washington, D.C., Chapter, Special Libraries Association.

Report on a Conference on Library Technology, funded by EFL, held at the School of Education on February 9, 1967, Harvard University, Cambridge, Mass.

Richnell, D.T., The Hale Committee Report and Instruction in the Use of Libraries. A paper given at the University and Research Section Conference, Reading, April 1965.

Rogers, Dr. Frank Bradway, Librarianship in a World of Machines. First Annual C.C. Williamson Memorial Lecture, George Peabody College for Teachers, Nashville, Tenn., May 1966.

Sewell, P.H., Technical College Libraries: Developments and Needs Since the Issue of Circular 322. A paper given to the Colleges of Technology and further Education Sub-Section of the Library Association at Liverpool, April 1966.

Silberman, Harry F., Using Computers in Education: Some Problems and Solutions. Paper presented at the USAFE Education Services Conference, Wiesbaden, Germany, October 1966.

Silvern, Gloria M. and Leonard C. Silvern, Computer-Assisted Instruction: Specification of Attributes for CAI Programs and Programmers

Silvern, Leonard C., Programmed Instruction and Computer-Assisted Instruction--How They can be Used Effectively in Our Training Programs. Paper at the Third International Simulation and Training Conference, April 1967.

Sister Helen Sheehan, S.N.D., Students and the Library, A paper given at Drexel Library-College Conference, December 20, 1966.

Taylor, Robert S., Definition, Scope, and Preliminary Program for the Library and Related Activities at Hampshire College. A working paper. Report to Hampshire College, Amherst, Mass., February 1967.

University of California Institute of Library Research, Annual Report, July 1965-June 1966.

University of New Hampshire Library, Information for Head Residents; New Student's Guide; How to Become a Proficient User; Introducing the UNH Library to Faculty Members, Administrative Personnel, Graduate Students; Pre-arrival Library Instruction for College Students

Wannamacher, James C., *Library Program for Columbia: A Summary*. Summary of a Project Report prepared for Columbia, Maryland.

Wright, Gordon H., *Reprography Aids HERTIS in its Bibliographic Service to Education and Industry*. A summary of a paper delivered at the Reprographic Congress, Cologne, 1963.

OE 6000 (REV. 9-66)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION

# ERIC REPORT RESUME

| | |
|---|---|
| ERIC ACCESSION NO. | |
| CLEARINGHOUSE ACCESSION NUMBER | |
| RESUME DATE | 03-15-68 |
| P.A. | |
| T.A. | |

IS DOCUMENT COPYRIGHTED? YES ☐ NO ☒
ERIC REPRODUCTION RELEASE? YES ☒ NO ☐

TITLE
Study to Develop A Research Program for the
Desigh Devolopment of Modern College Libraries
(Final Report)

PERSONAL AUTHOR(S)

INSTITUTION (SOURCE) Historical Evaluation and Research Organization
1403 Dolley Madison Boulevard, McLean, Virginia. 22101

SOURCE CODE

REPORT/SERIES NO. 3017

OTHER SOURCE

SOURCE CODE

OTHER REPORT NO.

OTHER SOURCE

SOURCE CODE

OTHER REPORT NO.

PUB'L. DATE 03-15-68

CONTRACT/GRANT NUMBER OEC-1-7-070031-5137

PAGINATION, ETC.
106 pages

RETRIEVAL TERMS

IDENTIFIERS

ABSTRACT

This study formulates a research program to facilitate the establishment of libraries for small liberal arts colleges using modern library methods and technology and new techniques of information storage, retrieval and transfer. As a result of exclusive interviews with librarians and others in the United States and Europe and from a review of current literature, areas in which further research is needed were defined as: systems analysis and design; new technology and techniques; coordination of administration and user-oriented service; interrelationship of education, information, and library services; and potentialities of information storage and retrieval. New educational concepts and techniques affecting libraries include more independent study, integration of academic disciplines, audio-tutorial teaching methods, learning centers, and the library-college. The ambiguous relationships of non-book information media--audio-visual, reprographic, miniaturized, and automated--to the college library require clarification. The objectives of education, the role of the library and the librarian, coordination with the faculty in book selection, budget problems, potentialities of the computer, inter-library cooperation, cost effectiveness, and decentralization vs. consolidation, are problems that need study as a basis for development of a new college library. A detailed outline of a research program is included.

E-BR
LI
must

FROM:

ERIC FACILITY,
SUITE 601
1735 EYE STREET, N. W.
WASHINGTON, D.C. 20006